REPORT

OF THE

MINISTER OF AGRICULTURE

FOR THE

DOMINION OF CANADA

FOR THE YEAR ENDED MARCH 31

1914

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OTTAWA
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1914

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REPORT

OF THE

MINISTER OF AGRICULTURE

1913-14

To Field Marshal, His Royal Highness Prince Arthur William Patrick Albert, Duke of Connaught and of Strathearn, K.G., K.T., K.P., etc., etc., etc., Governor General and Commander in Chief of the Dominion of Canada.

MAY IT PLEASE YOUR ROYAL HIGHNESS:

I have the honour to submit to Your Royal Highness a report of the Department of Agriculture for the fiscal year ending March 31, 1914.

I.—GENERAL REMARKS.

The work of the department has been carried on efficiently, and a synopsis of the operations of the various branches comprised therein is laid before Your Royal Highness under their respective headings.

The legislation affecting the department during this period consisted of:—

Chapter 5, 3-4 George V, intituled "An Act for the granting of aid for the advancement of Agricultural Instruction in the Provinces." (Assented to 6th June, 1913.)

Chapter 6, 3-4 George V, intituled "An Act to amend the Animal Contagious Diseases Act." (Assented to 6th June, 1913.) (In force 15th July, 1913.) See proclamation dated June 13, 1913, *Canada Gazette,* dated 14th June, 1913.

Chapter 25, 3-4 George V, intituled "An Act to amend the Inspection and Sale Act." (Assented to 6th June, 1913.)

By Order in Council of date the 14th April, 1913, the administration of chapter 30, 7-8 Edward VII, intituled "An Act respecting the Sale and Marking of Manufactures of Gold and Silver, and Gold and Silver Plated ware," formerly administered by the Minister of Agriculture, was assigned to the Minister of Trade and Commerce.

By an Order in Council of date the 25th day of June, 1913, the following regulations were made and established under the provisions of section 320*a* of the Inspection and Sale Act:—

1. In these regulations:

(*a*) "importer" means the person, firm or corporation in Canada to whom fruit from outside of Canada is sold, shipped, consigned or delivered.

(*b*) "fruit" means apples, crab apples, pears, plums and peaches when shipped in closed packages.

(*c*) "inspector" means an inspector employed by the Department of Agriture of Canada to enforce the provisions of Part IX of the Inspection and Sale Act, chapter 85, Revised Statutes of Canada, 1906, and the regulations made thereunder.

2. No fruit shall be imported into Canada except as hereinafter provided.

3. Every importer of fruit, or his representative, shall cause all grade marks found on closed packages containing imported fruit to be completely removed, erased

or obliterated, when such grade marks are different to, or inconsistent with, the markings or branding required by sections 320 and 321 of the Inspection and Sale Act, or section 4 of these regulations.

4. Every importer of fruit, or his representative, shall cause all closed packages containing such imported fruit to be marked or branded in a plain and legible manner, in letters and figures not less than half an inch long, and in the following form:—

{Place here the proper grade marks.} {Place here the correct name of the variety.}

Imported by

{Insert here the name and address of the importer.}

5. The removal, erasure or obliteration of original grade marks or brands on closed packages containing imported fruit and the re-marking or branding of said closed packages to conform with the provisions of the Inspection and Sale Act as required by these regulations, shall be done at the time when the said packages are being taken from the railway car, steamship or other conveyance in which they have been brought into Canada.

6. The marks or brands specified in section 4 of these regulations shall be placed on the end of the packages.

Vide Canada Gazette, vol. xlvi, p. 4797.

By an Order in Council under date the 8th day of October, 1913, the regulations under "The Destructive Insect and Pest Act," established by Order in Council under date the 11th day of May, 1910, were further amended by adding after the word "Manitoba" in line 7 of regulation 3 thereof the words "North Portal, Sask."

Vide Canada Gazette, vol. xlvii, p. 1091.

By an Order in Council of date the 4th day of December, 1913, the regulations under "The Destructive Insect and Pest Act," established by Order in Council of the 11th May, 1910, were further amended by striking out the words "Importations by mail shall be subject to the same regulations," in line 14 of regulation 3 and by adding thereto the following new regulation:—

"18. The importation of all nursery stock, including trees, shrubs, plants, vines, grafts, scions, cuttings or buds, through the mail is prohibited, excepting greenhouse-grown florist stock, cut flowers, herbaceous perennials, and bedding plants, which will be admitted provided that a detailed statement of the contents is attached to such parcels."

The said regulation to take effect on and after the 1st day of March, 1914.

Vide Canada Gazette, vol. xlvii, p. 1865.

Whereas by Order in Council dated the 19th August, 1911, regulations were established with a view of eradicating certain contagious diseases among horses in certain portions of the province of Alberta;

And whereas the Veterinary Director General has reported that it would be advisable and in the public interest to remove the restrictions at present in force from a portion of the territory now under restrictions in the said province;

Therefore, by Order in Council under date the 4th day of December, 1913, the above named regulations were amended as follows:—

The words "Townships 40 and 41" in the second paragraph of the said Order in Council of the 19th August, 1911, are cancelled and the words "Townships 34 and 35" substituted therefor.

Vide Canada Gazette, xlvii, p. 1865.

Whereas by Order in Council dated the 8th June, 1911, regulations were established in connection with mange in cattle in certain portions of the provinces of Saskatchewan and Alberta, owing to the prevalence of the said disease of mange in the said provinces;

And whereas the Veterinary Director General has reported that it would be advisable and in the public interest to remove the restrictions at present in force from a portion of the territory now under restrictions in the province of Alberta;

Therefore, by Order in Council under date the 4th day of December, 1913, the above named regulations were amended as follows:—

The words "Townships 40 and 41" in the second paragraph of the said Order in Council of the 8th June, 1911, are cancelled and the words "Townships 34 and 35" substituted therefor.

Vide Canada Gazette, vol. xlvii, p. 1865.

By an Order in Council under date the 13th day of December, 1913, the regulations established under "The Quarantine Act" were further amended by striking out the figures "18" in the second line of subclause (*d*) of clause 31 thereof and substituting therefor the figures "14" so as to fix fourteen days as the recognized period of incubation for smallpox instead of eighteen days as at present.

Vide Canada Gazette, vol. xlvii, p. 1969.

By Order in Council under date the 10th day of January, 1914, the regulations established by Order in Council of 30th November, 1909, under "The Animal Contagious Diseases Act," were further amended by adding to clause 42 thereof the following subclause:—

"The importer will also be required to produce an affidavit to the effect that the swine he proposes to import have not been immunized to hog cholera by the simultaneous injection of hog cholera virus and serum."

Vide Canada Gazette, vol. xlvii, p. 2337.

By an Order in Council of date the 14th day of February, 1914, the regulations established by Order in Council of the 11th May, 1910, under "The Destructive Insect and Pest Act" were further amended by striking out clause 6 thereof and substituting therefor the following:—

"6. Nursery stock, not including such stock as is exempt under section 3 of these regulations, originating in Europe, shall be imported only through the ports and with the exception of St. John, N.B., during the period specified under section 3 for stock requiring fumigation, with the addition of the ports of Halifax, N.S., Sherbrooke, P.Q., and Montreal, P.Q., through which ports, and also the port of St. John, N.B., such European stock may enter from September 15 to May 15. Such European nursery stock, and such other imported vegetation as the Minister may determine, entering Canada, shall be exempt from fumigation, but shall be inspected, either at the port of entry or at its destination to which it may be allowed to proceed, but in the latter case it must not be unpacked except in the presence of an inspector."

Vide Canada Gazette, vol. xlvii, p. 2794.

By an Order in Council of date the 16th February, 1914, the regulations under "The Animal Contagious Diseases Act," established by Order in Council of the 30th November, 1909, were further amended by adding thereto the following additional section:—

"IMPORTATION OF ANIMALS FROM THE UNITED KINGDOM.

"Sec. 30½. Animals, as aforementioned in the preceding eight sections, imported from Great Britain, must be accompanied by an official certificate of the Board of Agriculture and Fisheries instead of that of the local authority and, animals imported from Ireland direct or transhipped in Great Britain, by an official certificate of the Department of Agriculture and Technical Instruction for Ireland.

"This amendment shall take effect from the 1st day of June, 1914."

Vide Canada Gazette, vol. xlvii, p. 2795.

By an Order in Council of date the 7th day of March 1914, the regulations under "The Destructive Insect and Pest Act" established by Order in Council dated the 11th May, 1910, were further amended by adding to section 12 thereof, which contains a list of destructive insects, pests and diseases to which the said Act shall apply, the following insect pest, the "Potato Tuber Moth (*Phthorimaea Operculella* Zett)"; and by adding to section 13, after the word "Miquelon" in the second line thereof, the following words, "also the state of California, being one of the United States of America."

Vide Canada Gazette, vol. xlvii, p. 3119.

THE AGRICULTURAL INSTRUCTION ACT.

This Act was assented to on the 6th June, 1913, and was for the purpose of granting aid for the advancement of Agricultural Instruction in the provinces.

The money voted to the provinces under it will be devoted exclusively to agricultural education. The basis of expenditure in each province to be as agreed upon between the Federal Minister of Agriculture and the respective provincial ministers. The appropriation under this Act will enable the provinces to increase the efficiency and equipment of the agricultural colleges, establish agricultural schools, dairying and horticultural schools, short courses in agriculture, to initiate agricultural teaching in the public schools and work by travelling or located qualified instructors, and to undertake such other lines of educational work in agriculture as may seem desirable.

According to the terms of this Act $10,000,000 are to be given to the provinces to be expended on agricultural education during the next ten years. Subsequent to the passing of the Act, $700,000 was allotted the first year and this amount will be increased by $100,000 annually until 1917, from which year until 1923, $1,100,000 will be provided yearly.

Speaking broadly the division of the money among the provinces will be on a population basis. There are, however, slight modifications of this principle. In the first place, $20,000 a year is to be set aside to be divided among such veterinary colleges as grant degrees and come up to a required standard. In addition $20,000 will be allotted to each province regardless of population. The provinces shared as follows in 1913:—

Prince Edward Island	$ 26,529 85
New Brunswick	44,509 93

Alberta	$ 46,094 95
British Columbia	47,334 76
Manitoba	51,730 05
Nova Scotia	54,288 45
Saskatchewan	54,296 29
Quebec	159,482 40
Ontario	195,733 32

It is provided that if any year any province is not prepared to use all its grant, the unused remainder shall be held by the Dominion for future use by that province, or until such time as it can make good a claim, or show good cause for its payment. If from lack of educational machinery, or for any other reason, any province is not able to submit a satisfactory scheme, the Federal Government would be prepared to formulate one for such province's assent.

At the beginning of the calendar year there was commenced the publication of a monthly magazine, "The Agricultural Gazette of Canada." It is issued from the Publications Branch and constitutes the official organ of the department. The information contained is not, however, confined to the work of this department, but, through the co-operation of officials in Provincial Departments of Agriculture and other duly organized institutions concerned with the advancement of agricultural instruction and investigation, there is chronicled, from month to month, many of the more important activities of governmental and other organizations in all parts of Canada.

The *Agricultural Gazette* is not circulated generally but is sent only to the press, to legislators and to those engaged in official agricultural and educational work. A small additional number of copies of each number are printed, for which a subscription fee of one dollar per year is charged.

An event of importance was a Conference of Agricultural Instruction held in Ottawa on March 24 and 25. At this meeting there were brought together representatives of the Provincial Departments of Agriculture and of Education, Agricultural and Veterinary Colleges, and included five provincial Ministers of Agriculture, eight provincial Deputy Ministers of Agriculture, nineteen representatives of Departments of Education and educational institutions, besides a number of other important officials of Provincial and Dominion Departments.

The purpose of the conference was to discuss plans and exchange ideas in regard to work carried on by the several provinces under the provisions of The Agricultural Instruction Act.

The gathering, which was more or less informal, occupied a morning and an afternoon session each day. No set programme was prepared. The chief subjects discussed were demonstration work, district representative work, agricultural instruction in the schools, the work of agricultural colleges and schools and the *Agricultural Gazette.* Besides facilitating the objects of The Agricultural Instruction Act, the members appreciated the opportunity afforded them to become acquainted and to learn some of the details of what each was doing in widely separated fields, in the interest of a common cause.

In May, 1913, the meetings of the General Assembly of the International Institute of Agriculture were held at Rome, and attended on behalf of Canada by Mr. Philemon Cousineau, K.C., LL.D.; Mr. R. F. Stupart, F.R.S.C., F.R.A.S.C., Director

of the Canadian Meteorological Service; Mr. H. G. Dering, M.V.O., First Councillor of the British Embassy at Rome; and Mr. T. K. Doherty, LL.B., Commissioner of the International Institute of Agriculture for Canada.

Since the holding of the last General Assembly the number of States adhering has increased from forty-eight to fifty-three. The continual expansion of the work of the Institute and consequent increased expenditure called for an increase of the regular contribution of the adhering States from 1,500 francs per unit, which has been paid up to the present time, to 2,500 francs per unit from January 1, 1914. Canada's annual contribution will, in consequence, be raised from 12,000 to 20,000 francs.

The proceedings of the General Assembly were marked by three striking progressive steps, viz., the creation of a permanent Meteorological Commission, the drawing up of the "Acte Final" for the creation of an International Phytopathological Commission, the adoption of special measures for the more rapid collection and publication of crop reports.

(1) *Creation of an International Meteorological Commission.*—Mr. R. F. Stupart, director of the Canadian Meteorological Service, who is a member of that commission, has, as a consequence of this international action, secured an additional staff of three graduates of the Guelph Agricultural College, specially qualified to investigate the application of meteorology to agricultural requirements. The system is being rapidly expanded so as to extend its benefits to a variety of agricultural interests.

(2) *Drawing up of the "Acte Final" for the creation of an International Phytopathological Commission.*—Mr. H. T. Güssow, Dominion Botanist, represented Canada at the International Phytopathological Conference held at Rome, February 24 to March 4, 1914, and was one of the signers of the "Acte Final," which was also signed by sixty-five other representatives, including four from the United Kingdom of Great Britain and Ireland.

The prime object of the conference was the perfecting of arrangements for the control of plant diseases and which, subject to the fulfilment of certain specific conditions, would permit of the regular free transmission through the ordinary channels of trade, of nursery stock, or rather of living plants and living parts of plants (sets, cuttings, grafts, flower-bulbs and cut flowers) intended for export. This purpose was attained at the conference by the application of provisions similar to those that had proved successful through the Phylloxera Convention for the protection of the vine. The adhering Governments must be prepared to declare that they possess: (1) arrangements for the efficient supervision of the areas where the plants are grown; (2) arrangements for the inspection of packages of plants; (3) arrangements for granting certificates of freedom of plants from disease. The provisions of the conference are not to apply to vines, seeds, cereals, tubercles, bulbs, fruit, vegetables, etc. The members of the International Commission of Experts, since the Institute is its official centre, are expected to meet at Rome at the time of the meetings of the General Assembly for the purpose of coming to an understanding on questions of common research and studies.

(3) *The adoption by the Institute of special measures to insure the more rapid collection and publication of crop reports.*—This was brought up at the General Assembly meetings on the proposal of Mr. T. K. Doherty, one of the Canadian representatives.

On January 24, 1914, the Second Commission of the Institute reported favourably through its president, Dr. Müeller, of Germany. The Permanent Committee, at its meeting of March 12, concurred and declared its belief in the possibility of bringing about the earlier publication of the "Bulletin of Agricultural Statistics," and instructed the general secretary to communicate with the various Governments to endeavour to secure from them a more rapid transmission of official data. It is hoped that through the measures to be proposed and recommended by the Institute, other countries will be induced to vie with the United States in the matter of speed and be prepared to furnish their reports to the Institute, at the latest, on or before the 10th of the month.

In the appendix will be found a detailed report of the proceedings of the last General Assembly, together with the report of Canada's delegate to the International Phytopathological Conference. (See appendix No. 19.)

The office of the Canadian Commissioner of the Institute continued issuing the monthly bulletin, "The Publications of the International Agricultural Institute," during the year. With the January, 1914, number the name of this bulletin was changed to "The Bulletin of Foreign Agricultural Intelligence." The circulation of the bulletin now amounts to 9,500 copies per month. The bulk of the contents are taken from the "Bulletin of Agricultural Intelligence and Plant Diseases," the original articles by agricultural experts, republished in full, being an important feature. Detailed statistics of crops, live stock censuses and imports and exports of cereals were also given. The service of sending out multigraph crop reports, on receipt of the cabled reports from the Institute was continued.

During the year, besides the regular bulletin the Institute issued several valuable publications. Among these were "Notes on the Statistics of Foreign Trade in the Different Countries: Statistical Publications, Territory, Kinds of Trade, Source and Destination of Goods," "Organization of the Statistics of Foreign Trade in Italy," "The Agricultural Produce Exchanges of Hamburg and Budapest," "The Antwerp Corn Market," "Agricultural Division of the Territory of the different Countries," "The Present Organization of the Services for the control of Plant Diseases and Insect Pests in the different Countries," "Production and Consumption of Chemical Manures in the World," "Monograph on Agricultural Co-operation in different Countries, vol. 2," and "Agricultural Credit and Co-operation in Italy."

The efforts to obtain recent official publications of various countries for the library have been continued; 400 new books were added during the year, bringing the total number of bound volumes to 1,578; 110 periodical publications are received in exchange or by subscription. Increased accommodation has been provided and there are now 630 feet of shelving.

The bulletins and card indexes of the United States Department of Agriculture and Experiment Stations are regularly received and filed.

Cards referring to agricultural publications in the Library of Congress are also received quarterly and are in process of classification. Analytic cards for subjects treated in "Annales des Institutions Agronomiques" are also received and classified.

A report from the Canadian Exhibition Commissioner for the fiscal year ended 31st March, 1914, will be found as an appendix hereto. (See appendix No. 18.)

The Canadian Exhibition Commissioner and staff are busily engaged in the preparation of a Canadian display of the natural resources of the Dominion for exhibit at the Panama-Pacific Exposition to be held in San Francisco early next year.

With regret I have to report the death of a valued officer of the Public Health Branch, Doctor A. T. Watt, Superintendent of British Columbia Quarantines, Victoria, B.C. Doctor Watt died on the 27th July, 1913.

Canada participated in the third meeting of the International Congress of Refrigeration held at Chicago in September, 1913, and was represented thereat by Mr. J. A. Ruddick, the Dairy and Cold Storage Commissioner.

H. Rundle Nelson, M.D., B.Ch.L., M.B.A., of Victoria, B.C., was appointed medical superintendent of the Quarantine Station at William Head, B.C., from the 22nd September, 1913, vice Doctor A. T. Watt, deceased.

A disastrous fire took place on the morning of the 11th of October, 1913, at the Central Experimental Farm at Ottawa, by which the main barn, the bull barn and the steer barn were completely destroyed. Arrangements were at once made for the prompt reconstruction of the barn.

Personally I visited the Universal Exposition at Ghent, Belgium, last summer, where Canada had a large and important exhibit.

This exposition obtained a great success and attracted much attention, Canada's display of natural products and resources being most creditable.

While in Europe I also looked into agricultural matters in Great Britain and on the continent and discussed matters affecting the Federal Department of Agriculture.

II.—ARTS AND AGRICULTURE.

DAIRY AND COLD STORAGE BRANCH.

There has been no change in the organization of the Dairy and Cold Storage Branch during the past year. The four divisions of Dairying, Fruit, Extension of Markets, and Cold Storage, into which the Branch is divided for systematic work have been continued under the general direction of Mr. J. A. Ruddick, as Dairy and Cold Storage Commissioner.

THE DAIRYING SEASON OF 1913.

The season of 1913 was marked by a period of very dry weather in some of the chief producing districts of Eastern Canada, and the supply of milk was somewhat reduced on that account. There was a noticeable increase during the past year in the quantity of milk diverted from cheese factories in Ontario and in western Quebec to supply the growing demand for milk and cream in the towns and cities. There was also a continued growth in the city creamery business. It is a rather regrettable feature of this movement that these creameries are drawing their supplies of cream chiefly from the patrons of old-established cheese factories and creameries, thus reducing the revenue which is already too small for the welfare of the business. Their operations cover a very wide area in some cases.

While there is a general increase in milk production in every part of Canada, the province of Nova Scotia and the three prairie provinces are showing the largest percentage development in factory dairying at the present time. New creameries are being started in all these provinces, and the local authorities report a great increase of interest in the dairying industry.

INCREASE OF DAIRY PRODUCTION.

The figures of the Census of 1911, which have only recently become available, show a total increase in the number of cows in Canada of only 185,502 in ten years, but the total value of dairy products during the same period increased from $66,470,953 to $109,340,024.

The average annual yield of milk per cow has been increased from 2,850 pounds in 1900 to over 4,000 pounds at the present time. This result is partly due to the general improvement in live stock, but the cow-testing work promoted by the Dairy Division has undoubtedly been a potent factor in raising the productiveness of Canadian dairy cows. This improvement has added over $25,000,000 to the annual value of dairy production in Canada, and the end has not yet been reached.

THE EXPORT TRADE.

There was a further decrease of about 15,000,000 pounds in the export of cheese for the season of 1913, with some increase in the shipments of cream and milk to the United States.

The exports of dairy products in 1913 amounted to about 15 per cent of the total production, as against 34 per cent in 1900.

THE HOME TRADE IN DAIRY PRODUCTS.

The total home consumption of milk and dairy products has increased 75 per cent during the past ten years, and the per capita consumption during the same period shows an increase of over 30 per cent. It would appear from these figures that home consumption is increasing rather faster than production.

COW TESTING.

The cow-testing work which was started several years ago is now making rapid progress. Twenty-two Dairy Record centres were in operation in 1913, and a large number of small cow-testing associations in different parts of the country were assisted through the Dairy Division. Hundreds of farmers are supplied with the blank forms for keeping records on their own account. The propaganda in connection with the cow-testing movement consists of:—

(*a*) The publication of popular bulletins, circulars, etc.;

(*b*) The frequent preparation of short articles for the press dealing with various aspects of the work and citing specific cases of increase in milk yield as a result of systematic testing;

(*c*) Addresses given by recorders, provincial supervisors, and headquarters staff;

(*d*) Personal visits to farmers by recorders; and

(*e*) A very extensive correspondence.

The large amount of clerical work involved in the calculation and compilation of the records is done at headquarters.

MODEL CHEESE FACTORIES AND CREAMERIES.

The model combined cheese factory and creamery at Finch, Ont., and the model creamery at Brome, Que., have been operated during the year. They have been visited by a large number of persons interested in cheese factory and creamery work. The value of improved equipment and proper facilities for winter work has been clearly

demonstrated during the past winter, when the unusual demand for milk and cream in Montreal enabled the management to supply that market with a high-class article of both milk and cream at prices which were very satisfactory to the patrons. The quantity of milk received during the past winter at the Finch station was three times greater than the quantity delivered in 1912-13.

FRUIT INSPECTION.

For the purpose of enforcing the law, the country is divided into five districts, with a chief inspector over each, and a staff of subinspectors assigned to definite territory within each district.

During the season of 1913-14, fifty-one inspectors were thus employed.

There is no attempt to inspect all packages of fruit. The onus of proper grading and marking rests on the packer.

Special attention is paid to the ports of Montreal, Halifax, Quebec and Vancouver, and to fruit imported from the United States into the prairie provinces.

Imported fruit must be marked in the same manner as the domestic article, the importer, who is held responsible, being required to place his name and address on each package.

Packers or importers who are detected in violations of the law are prosecuted and the names of those convicted are published.

There were 103 convictions during the season of 1913-14.

THE ENFORCEMENT OF THE DAIRY LAWS.

Part VIII of the Inspection and Sale Act is also administered by the Dairy and Cold Storage Commissioner. A number of prosecutions have been made during the past year against creameries and dealers for selling butter containing over the legal limit of 16 per cent of water in butter.

Some difficulty has been experienced in securing convictions owing to certain ambiguities in the existing statutes. For the purpose of remedying these defects and broadening the scope of the dairy laws, I have introduced a Bill into the House of Commons, by which it is proposed to repeal Part VIII of the Inspection and Sale Act.

FRUIT CROP REPORT.

Each season, from May to September, a monthly Fruit Crop Report is published, showing the state and prospects of the fruit crop in Canada and, to a certain extent, in other countries as well.

INSTRUCTIONS IN FRUIT PACKING, ETC.

To meet the increasing demand in Eastern Canada for instruction in the packing of apples in boxes, an expert attached to this Branch is employed throughout the season in demonstrating that method of packing.

During the slack season, the permanent fruit inspectors assist at orchard meetings for the purpose of giving instructions in pruning, grafting, etc.

EXPERIMENTAL COLD STORAGE FOR FRUIT.

An experimental cold storage warehouse for fruit is now being erected at Grimsby, Ont. It will afford facilities for carrying on experiments in the cold storage of different varieties of fruit, and also in demonstrating the value of pre-cooling for long distance shipment.

ICTD CAR SERVICES.

The arrangement was renewed with the railways for a refrigerator car service for butter, covering the period from the middle of May to the middle of October, to Montreal, Quebec and Halifax. These cars are run weekly or fortnightly, according to the requirements of the route, on an advertised schedule so that shippers are enabled to deliver their butter at the railway station with the least possible exposure to heat. Any quantity from one package upwards can be shipped in these cars at the regular less-than-carload rate, without extra charge for the icing or for the special service. The departmental guarantee on each car amounts to two-thirds of the earnings of a minimum carload from starting point to destination and, in addition, about two-thirds of the cost of icing.

Inspectors were employed, as has been customary for several years, at the freight terminals to watch the unloading of these cars and report on their condition, the temperature of the butter and the quantity of ice remaining in the bunkers. These inspectors make daily reports to the department, and any defects or deficiencies in the services are promptly brought to the attention of the responsible railway authorities. In this way an efficient service is maintained.

Commencing about the middle of June and extending over a period of eleven weeks the department paid the icing charges up to $5 per car on a limited number of refrigerator cars when used for carload shipments of cheese.

An arrangement similar to the foregoing, except that there was no limit to the number of cars, was in force from August 1 to October 1 for carload shipments of early apples and tender fruit consigned to Montreal and Quebec for export in cold storage.

CARGO INSPECTION.

During the year cargo inspectors were employed at Montreal, Quebec, Halifax, Liverpool, London, Glasgow, and during the winter season at Portland, Me., to report the condition in which perishable goods were delivered to and discharged from the steamers, and to supervise the handling generally.

Over 200 thermographs were used in this service and over 3,700 copies of continuous temperature records were made for distribution.

COLD STORAGE SUBSIDIES.

The Cold Storage Act (chapter 6, 6-7 Edward VII), of which the details of administration are also in the hands of the Dairy and Cold Storage Commissioner, is intended chiefly to encourage the erection of small local public cold storage warehouses for the preservation of perishable food products. It provides that the Government may grant a sum not exceeding 30 per cent of the total cost of site, equipment and construction of such public cold storage warehouses. The subsidy is paid in instalments which are spread over a period of four years. No assistance is given to any company proposing to build in places where a public cold storage is already in existence. The rates charged in subsidized warehouses are subject to the approval of the Governor in Council.

CREAMERY AND FARM COLD STORAGES.

A bonus of $100 is paid to any creamery that erects suitable cold storage rooms according to plans and specifications furnished free by the department.

Working plans and specifications for small cold storages and dairies suitable for a farmer's use, are also distributed free to all who apply for them

PUBLICATIONS AND INSTRUCTION.

An annual report is published showing in detail the work of the Branch. Bulletins and circulars on various subjects are issued from time to time for free distribution.

Members of the staff address a large number of farmers' meetings throughout the year, officiate as judges at dairy and fruit exhibitions and at milking competitions, and, through an extensive correspondence, act in an advisory capacity on a great variety of subjects.

SEED COMMISSIONER'S BRANCH.

This Branch has for its object the encouragement of the production and use of superior seeds. Field crop competitions, seed fairs and provincial seed exhibitions, established in co-operation with the Provincial Departments of Agriculture, encourage the production of such seeds. A money grant to the Canadian Seed Growers' Association, direct subventions to growers of field root and garden vegetable seeds that are not commonly grown in Canada, and other educational work serve the same purpose. Seed laboratories are maintained in Ottawa and Calgary for testing and grading seeds for farmers and seed merchants, and a limited control over the trade, as provided by the Seed Control Act, is secured through the inspection of seeds when exposed for sale by retailers.

Seeds of cereal grains and most kinds of grasses and clovers used on Canadian farms are home-grown, but practically all our field root and garden seeds are imported. Some kinds of seeds commonly used by farmers and gardeners usually require particular attention on account of their defective purity or vitality caused by unfavourable climatic conditions. The seed crop of 1913, however, is a fortunate exception to the rule, and it is encouraging to be able to report that the supplies of both home-grown and imported seeds were never better than for the ensuing year.

SEED GROWING.

I am pleased to be able to report that the assistance and co-operation extended by my department to the Provincial Departments of Agriculture to encourage greater care in the production and use of seed grain have been both useful and educational, and I have arranged to have this work continued and enlarged. Last year 315 field crop competitions, 183 seed fairs and 12 provincial seed exhibitions were conducted, all of the provinces reporting satisfactory progress with them.

The Canadian Seed Growers' Association has continued and enlarged its service to agriculture. During the last ten years it has received an annual grant from my department in addition to much assistance from the officers of this Branch. It was arranged at the time of its organization that as soon as the association was sufficiently well established to assume full control of its own affairs, it should take over all its work. I have this year been pleased to give effect to that idea and to increase the amount of its grant to enable the association to carry on its work more efficiently.

For many years a few farmers and gardeners in Canada have produced small quantities of field root and vegetable seeds of superior quality for their own use. The information available would seem to indicate that home-grown selected seeds produce, on the whole, more satisfactory crops than do imported seeds. It was with a view gradually to extend the efforts of seed growers of such crops, that had not before been extensively grown for seed in Canada, that I authorized special encouragement to be given to the growers in the form of direct subventions based on the quantity of selected seed produced by them. It is satisfactory to note that this encouragement has had the effect of stimulating to increased efforts, and there is good reason to believe that the results will be highly beneficial.

SEED TESTING.

The testing of seeds includes purity analysis to determine the kinds and quantities of weed seeds and other foreign or inert matter, a germination test to determine the percentage of seeds capable of germinating under favourable conditions, and trial plot tests to determine whether or not a sample is true to the kind and variety represented. A seed laboratory is maintained in Ottawa for the service of the East, and one at Calgary for the West of Canada, in which purity and germination tests are conducted in connection with educational work and the administration of the Seed Control Act. In all, nearly 20,000 samples were tested and reported upon to farmers and seed merchants during the past year, forty-five of them having been received from farmers.

Certificates of grading on all samples of timothy and clover seeds are promptly issued. The time for a germination test varies with the kind of seed. The certificates issued give the necessary information to farmers and seed merchants to enable them to conform to the provisions of the Seed Control Act. The great volume of work in these laboratories is done during the months of January, February, March and April. During the summer and early autumn the staff of the seed laboratories is employed in preparing educational collections of seeds for distribution to schools of agriculture, and in special investigation work pertaining to the conditions of the seed supply.

The dissemination of screenings from wheat and flax has been the cause of considerable anxiety among farmers and farmers' organizations in different parts of Canada, and I have caused a thorough investigation to be made of the whole question in its relation to agriculture. The information now available would seem to indicate that under proper regulations the danger from using ground screenings for feeding may be greatly minimized if not entirely eliminated. The great bulk of the refuse which accumulates from the cleanings of cereal grains prepared for export is of splendid value as a food for stock, and I hope as soon as all the necessary information is at hand to be able to safeguard the handling of them in such a way as to serve the best interests of all concerned.

I have been pleased to co-operate with my colleague, the Minister of Inland Revenue, by undertaking the analysis of ground feeding stuffs in relation to their content of vital weed seeds. Three hundred and ninety-six samples were collected by officers of the Inland Revenue Department who have charge of the Adulteration of Foods Act, and of that number 140 were reported to contain noxious weed seeds that were vital.

SEED INSPECTION.

Seed inspection is necessary to secure the observance of the Seed Control Act. Samples of grass or clover are drawn by farmers or seed merchants and mailed to one of the laboratories. Certificates of grading are issued on the samples, which are kept on file for reference. When the seeds so graded are exposed for sale in the retail trade they come under the supervision of the seed inspection staff of this Branch. When any lot of seed is believed to be wrongly branded, a sample is drawn by the inspector and forwarded to the seed laboratory for comparison with the original sample for which the grading was issued. A reasonable allowance for natural variation in the proportion of impurities is made, and should the seed be of a quality inferior to the original sample, the seed merchant or farmer responsible for the grading is called upon for an explanation. Last year, in all, 4,212 merchants and farmers who sell seeds were visited and their stocks inspected; 839 violations of the Act were detected, the most of which were of a minor and trivial nature. The condemnation of the court is sought only in cases where there is reason to believe that a reasonably strict observance of the Act cannot be obtained by more lenient means. I regret to have to report that it was found necessary last year to institute proceedings against 87 persons who were dealing in seeds.

During the past year a useful and well-illustrated book of reference, "Fodder and Pasture Plants," which has been in the course of preparation for some time, was completed and is now being distributed free to public institutions and made available to individuals at a nominal price.

THE LIVE STOCK BRANCH.

Perhaps at no other time in the history of Canadian agriculture has there been a fuller realization than is now the case of the vital and far-reaching importance of live stock husbandry, not only in the permanent and successful exploitation of our varied and extensive agricultural assets but as well, even if indirectly, in the stable and equitable development of the commercial and industrial interests of the country. The fact, as borne out by the recent census, that live stock production through a period characterized by progressive industrial activity and an expanding human population has evidenced no corresponding growth or advancement, suggests a practical explanation of the present high cost of living, and directs attention to a weak link in the related enterprises contributing to our national prosperity. In the belief that an opportunity for effective work through the Live Stock Branch is now presented, I have thought it advisable to considerably strengthen this branch of the service and to provide an appropriation more commensurate with the duties and responsibilities devolving upon the department in the undertaking of aggressive work in the interests of our live stock husbandry. The increased vote which I have asked for and been able to obtain, and which aggregates an amount double that available in previous years, has made possible the undertaking of a new policy which has already been fully advertised and of the details of which the farmers are now generally cognizant. I refer to the assistance rendered by the department in connection with the loan, to associations of farmers in newly settled districts, of pure bred sires

for breeding purposes. The benefits derivable from this policy have been of a two-fold nature in that while the opportunity thus presented to the farmer of securing selected male breeding stock under reasonable conditions has made possible the retiring from use of large numbers of nondescript scrub sires to the consequent advantage of the breeder and feeder, there has been given to the business of rearing pure-bred stock the stimulus directly resulting from the opening up of a wide and undeveloped field of operation.

Owing to the fact that this policy was not entered upon until the late spring of 1913, it was found necessary to confine assistance, in so far as stallions and bulls were concerned, to new districts in the western provinces and in New Ontario. In all, five stallions and one hundred and one bulls were placed in the hands of associations during the year. The five stallions, including four Clydesdales and one Percheron, were located in New Ontario and in Quebec. The distribution of the bulls, by breeds and provinces, is indicated in the following table:—

—	Shorthorn.	Hereford.	Angus.	Holstein.	Ayrshire.	Red Polled.	Total.
Ontario	9			3			12
Manitoba	19	3	1	4			27
Saskatchewan	29		1	3	1	1	35
Alberta	19	1		4			24
British Columbia				1	2		3
	76	4	2	15	3	1	101

The stallions purchased for loan to associations are bought subject to a rigid veterinary examination, must be of suitable age, and are required to conform to a high standard as regards type, quality and action. None but Canadian-bred animals are handled, it being believed that it would be unwise to enter into competition with the importers of pure-bred stock. The fact that, in the case of stallions particularly, Canadian-bred animals are thoroughly acclimated, suggests the advantage to be derived from the use of sires which may be depended upon to leave a fair percentage of strong, hardy, vigorous progeny. The prices paid are not extravagant, but, as will be admitted, they allow Canadian breeders a very fair margin of profit. Bulls are bought subject to the tuberculin test, and must not be under twelve months of age.

In explanation of the policy, it may be stated that the purpose of the undertaking is to aid sections where pure-bred sires are lacking, and to encourage new communities in following a proper and intelligent system in breeding. It is not the intention to place animals in districts where suitable sires of the same class are already owned by private individuals. The animals purchased remain the property of the department but the local associations to which they are loaned are held responsible for their proper maintenance and management under the general supervision of officers of the branch. In the case of stallions, the members of the associations are required to pay a fee covering an annual insurance premium. In taking advantage of the offer of the department, the farmers of a district are required to organize a local association, the officers of which, in accordance with the provisions of the constitution decided upon,

assume responsibility for the maintenance of the animal applied for and for the proper administration of all business connected therewith.

Following the distribution of bulls and stallions during the summer months, a considerable number of rams and boars were located with associations during the fall and early winter. Both the Maritime and the Western Provinces, together with the newer portions of Quebec and Ontario, participated in the benefits of this latter distribution. One hundred and ninety-nine rams, representing the most prominent breeds, and one hundred and nine boars were supplied during the year.

Extending now over a considerable period, the development of the work of the Canadian Record of Performance has been very rapid, and, during the fiscal year 1913-14, the number of cows entered was more than double the number entered in a twelve months' period three years ago. This increase in the volume of entries is particularly interesting in view of the fact that no special effort has been put forth to induce breeders to participate in the advantages of the test. The growth has accordingly been a healthy one and has been brought about largely through the demand on the part of purchasers for evidence of production in the ancestry of breeding stock maintained for dairy purposes. As the Record of Performance test is the only official record which indicates the production during the full period of lactation of a cow carrying a calf, its value and importance has impressed itself upon breeders, and the steadily widening sphere of its influence is a natural result. In this connection it is of interest to note that, at its annual meeting in 1913, the Dominion Shorthorn Breeders' Association adopted a standard and authorized the testing of cows in the Canadian Record of Performance under the conditions imposed by the department. The large number of cows entered to date is an encouraging sign of the increased interest now being taken in developing the latent milking capacity of this breed.

Following the programme which had previously been initiated, an endeavour has been made to afford practical aid to wool growers through the demonstration of efficient methods in classifying and preparing wool for market. Two expert wool classifiers were stationed in the western provinces during the shearing season last summer, and their advice and services in explaining wool grading and packing operations were placed at the disposal of the wool growers. I have reason to believe that this assistance was much appreciated.

To give wider effect to the work which had been undertaken, an exhibit of foreign and domestic types of wools was prepared and displayed at several large fall and winter exhibitions throughout Canada. In addition to this, facilities were provided for the consignment of a trial shipment of approximately 50,000 pounds of wool to the London, Eng., market, with the view of standardizing and of obtaining recognition for Canadian wools in the chief clearing centre in the world for this product. The department assisted in this shipment by the payment of 25 per cent of the freight charges. The wool was sold to advantage, and it is gratifying to know that experts commented favourably upon its condition and quality.

Following the investigation referred to in a former report, a vigorous campaign has been conducted during the past year with the view of overcoming, in part at least, the enormous loss and shrinkage which has hitherto prevailed in connection with the trade in eggs. This campaign has included:—

1st. A definite recommendation to the wholesale trade, favouring the adoption of a system of quality payment for eggs.

2nd. The organization of co-operative marketing associations amongst producers.

3rd. The education of consumers in determining quality in eggs.

The advances made to the produce dealers with respect to quality payment have been well received. Owing, however, to the fact that in this country there is no recognized standardization in the grading of eggs, it has been impossible to develop this system of buying to its fullest extent. The trade has, nevertheless, generally adopted quality payment in having decided to buy on a loss-off basis, according to which deductions are made for all bad eggs and a higher price paid for the graded product than prevailed under the old case-count system.

Owing to the extremely high prices which new-laid eggs have commanded during the past year in the best Canadian markets, the public has shown a keen appreciation of the possibilities in the poultry business, as a result of which there has been a rapidly growing demand for the assistance which this branch is prepared to offer in the organization of co-operative egg marketing associations. This interest has been particularly apparent in the province of Prince Edward Island, where more than sixty associations have been formed, the total membership of which approximates 4,000 farmers. Other provinces have shared in this progressive movement, although not to so significant an extent.

As a further aid in successfully prosecuting the work, the attention of consumers has been directed to the means by which quality in eggs may easily be determined. The process of handling has been explained, an egg exhibit and candling demonstration has been presented at a number of the fall and larger winter exhibitions and a considerable quantity of cardboard egg candling appliances have been prepared for free distribution.

In view of the fact that the work of the branch has been considerably extended and augmented, a number of additions to the staff have been made necessary. The clerical staff of the office has been enlarged and several additions have been made to the Outside Service, through the appointment of inspectors in the Canadian Record of Performance and of a number of special officers in the several divisions. In this same connection, I would refer particularly to the appointment of Dr. J. P. Creamer, who has been engaged as representative of the Live Stock Branch for the provinces of Alberta, Saskatchewan and Manitoba.

DOMINION EXPERIMENTAL FARMS AND STATIONS.

The history of the Dominion Experimental Farms system during the year has been one of steady growth and expansion along lines already laid down. Areas have been added to several of the Branch Stations, permitting of a wider range of experimental work; substantial progress has been made in the erection of buildings, on the newer Stations especially, and in equipping them generally to take up the various lines of experimental work.

In March, land for an Experimental Station was purchased at Lennoxville, Que., and preliminary work will be pushed forward during the coming year.

On the branches already in full running order, new lines of work have been taken up and old ones continued, in many cases on a much larger scale than heretofore.

At the Central Farm, the increase of the work has necessitated the appointment of several assistants in the different divisions, each having charge of some special feature. The extension to the Chemical Laboratory has been practically completed, new greenhouses put under way, poultry buildings put up and substantial progress made with the new barn to replace the one unfortunately destroyed by fire on the 11th of October last.

The following publications have been issued during the year or are in the press at its close:—

Of the Regular Series, No. 72, Milk Production in Canada; No. 73, Smut Diseases; No. 74, Summary of Results with Cereals in 1913; No. 75, Summary of Results in Field Husbandry in 1913; No. 76, Summary of Results with Forage Plants in 1913, and No. 77, Summary of Results in Horticulture in 1913.

In the Second Series there were issued No. 15, on Preparing Land for Grain Crops on the Prairies; and No. 16, on How to Tell the Age of Hens and Pigeons.

Two Farmers' Circulars were brought out, No. 4 on Potato Diseases transmitted by the use of Unsound Seed Potatoes; and No. 5, on Powdery Scab.

Field Husbandry Division.

To obtain maximum profits in the growing of field crops is the aim of this division.

The investigational work now under way on the various Farms and Stations throughout the Dominion is of a very practical nature. Briefly it includes:—

1. Investigation of the relative merits of different crop rotations. On the Farms and Stations in Eastern Canada and in British Columbia, the object is to test thoroughly different rotations suitable for live stock purposes. In the Prairie Provinces where the production of saleable grain is still the great aim of the majority of farmers, they are designed more particularly for that purpose, though to meet the increasing demand for fodder crops a number of mixed farming rotations are being given a trial.

2. Studies in the methods of culture of, and curing, field crops. A series of soil cultivation experiments adapted to the dry conditions of the prairies has now been under way three years on each of the six prairie Farms and Stations. The chief object of these extensive experiments is to gather information concerning the conservation of moisture and soil fertility and the control and eradication of weeds.

3. Determinations of the cost of growing field crops under ordinary farm conditions.

4. Experiments to show the value of underdrainage and irrigation.

5. Studies of the influence of size and character of cultural implements on the cost of crop production.

6. Comparisons (in a limited way) of various grains and forage crops as food producers.

Division of Chemistry.

The work of the division has progressed satisfactorily in all its branches, though owing to the rapid development of the country and the increasing demand on the part of our agriculturists for information and advice respecting their every-day operations, it has been found difficult, and at times impossible, to keep pace with that phase of it which seeks to instruct and assist the man on the farm who looks to chemistry for help in the solution of the many problems that confront him. It is an encouraging sign of the times that throughout Canada generally there is an ever-increasing interest in what generally may be termed the principles of agriculture, in the knowledge of the nature, composition and properties of soils, fertilizers, feeding stuffs and other materials which by various agencies under skilful guidance may be transformed into profitable farm products. Thus it is that the correspondence and the examination of samples sent in by farmers now occupies a very much larger proportion of the time of the staff than they did a few years ago. This feature of the work has been encouraged because it has shown itself one of the best and most direct means of educating the farmer in matters that appertain to his vocation and for the dissemination of that information which if put into practice must tend to success.

During the year, 2,915 samples have been received for analysis or examination. They comprised soils, naturally-occurring fertilizers, fodders and feeding stuffs, insecticides and fungicides, well waters, etc., and while a large number of them were samples taken in connection with the investigations of the division, a very considerable proportion were sent in by farmers. The number further includes some 500 samples received for examination from the Meat Inspection Division, Health of Animals Branch. These had been taken in the course of inspection at the various packing houses and canneries of the Dominion, and consisted of lards, preserved meats, spices and condiments, evaporated apples, etc., etc.

Any detailed account of the many investigations carried on by the division will not be expected in this place, but an enumeration of them, with one or two words of explanation, will serve to indicate the wide field covered and the practical value of these researches to Canadian farmers.

Virgin Soils.—These have been chiefly from newly settled areas in the western provinces of the Dominion, and their analysis has been undertaken to ascertain their profitable value for tillage. Their general character and composition have been investigated, and from the data obtained an opinion has been expressed as to their suitability for cultivation and the crops most likely to succeed. Their deficiencies, if any, have been noted and the most economical means of supplying them suggested.

A number of soils collected in the western section of the Canadian Pacific Railway Irrigation tract, east of Calgary, have been critically examined with a view of determining the suitability of these lands for cultivation under irrigation. This investigation is still in progress.

Conservation of Soil Moisture.—This is a continuation of work commenced three years ago on several of the western Branch Experimental Farms, to learn the influence on the soil's moisture content of various systems of culture. It has already yielded some valuable results that may serve as a guide to the farmer in districts subject to a sparse rainfall.

Naturally-occurring fertilizers and amendments.—Analysis of the more abundant sea-weeds occurring on the Atlantic and Pacific sea-boards have been made, with a view of determining their relative value as potassic fertilizers. This work is still in progress, but the data already obtained clearly show that in many of them we have a material of high manurial value. In addition to their potash many of them contain a notable percentage of nitrogen. From the ready decomposition of sea-weed in the soil and the liberation of its plant food, we may expect a quick response when applied on soils, more particularly on warm, moist and light soils, that are deficient in potash.

Much interest has been evinced of late in Eastern Canada in the value of marl and finely-ground limestone for improving the physical condition and increasing the productiveness of soils. Our analyses have indicated that there are many Canadian soils that would be benefited by these compounds, to correct acidity and to supply a natural deficiency in lime. Deposits of marl and outcrops of limestone occur in many and widely distant points in the Dominion, but as yet neither marl nor ground limestone has been put generally on the market. Chemical analysis is necessary to determine the lime content of these materials, and this work has been prosecuted as opportunity permitted.

Fodders and Feeding Stuffs.—A series of products from the elevators' screenings, weed seeds, etc., has been submitted to analysis with a view to determining their composition and probable feeding value. Owing to the unpalatable character of many of the seeds making up these screenings the problem of a profitable use of this by-product becomes a matter of considerable moment, as every year there is a very large quantity resulting from the cleaning of wheat, flax, etc., at the elevators. It seems probable that by suitable sieves, etc., a certain separation may be made, resulting in a product that could be employed for feeding purposes, and other of the seeds being rich in oil could be of value in the preparation of this commodity for use in the arts and manufactures.

To learn the value of these products in poultry feeding, a series of feeding trials has been instituted in the fattening of cockerels. This is still in progress, so that final results cannot be reported, but it is expected that certain of the seeds may be found of value for this purpose, when mixed with ground grain. It is proposed to extend this work, employing sheep, pigs, etc.

Farm Roots.—A large number of the more commonly-grown varieties of mangels, carrots and turnips have been analysed and their relative feeding values tabulated. The information should prove of value to all feeders of stock.

The influence of the heredity in mangels, an inquiry begun in 1900, has received further investigation. The results go to show that quality is inherited and that to a certain degree it is independent of seasonal influences.

Sugar Beets.—The more important "factory" varieties of sugar beets as grown on the several Experimental Farms and Stations have been analysed, the data indicating as in former years that beets of excellent quality and quite suitable for sugar extraction may be grown in many and widely distant points in the Dominion.

Wheat.—The influence of environment on the composition of wheat has been further studied. It has been shown that profound modification as regards gluten content may be brought about by seasonal and soil conditions. The influences which

might be generally included under the term climatic undoubtedly have much to do in determining the ultimate quality of the wheat, and this investigation, carried on since 1905, has afforded much evidence towards establishing the conclusion that the high milling and baking quality of northwestern-grown wheat is due in a large part to the favourable conditions that usually prevail in the western grain-growing districts during the later summer months, leading to a quick maturation of the grain.

Well Waters.—There is no more valuable asset on the farm than an ample supply of pure water. The examination of waters from farm homesteads, which has from the first been an important and much appreciated feature in the work of the division, has been continued. It is gratifying to record that the interest in the subject of pure water becomes more and more keen throughout the rural parts; it must lead to improved health and thrift on the farm homestead.

Division of Horticulture.

There has been material development in the Horticultural Division during the past year. The appointment of Mr. M. B. Davis, B.S.A., as Assistant in Pomology, and of Mr. C. F. W. Dreher, B.S.A., as Assistant in Vegetable Gardening, necessary owing to the rapid growth of the Experimental Farms' Branch, has made it possible to extend the experimental work with fruits and vegetables, and has relieved the Dominion Horticulturist of a large amount of detail work at the Central Farm and enabled him to devote more time to the development of horticulture at the branch Farms and Stations, and to the increasing executive duties of the division.

During the year four new greenhouses were erected at the Central Farm, which give about 7,400 square feet under glass. These are now occupied and experiments are under way in floriculture, fruit culture, and vegetable culture, including the breeding and improvement of flowers, fruits, and vegetables. It is hoped and expected that the results of experiments in these greenhouses will be of considerable value, both to those who already have some glass and to the rapidly-increasing number who desire to erect greenhouses.

In 1913 the Dominion Horticulturist visited most of the Experimental Farms and Stations twice, to consult with the superintendents and advised them, when necessary, in regard to the horticultural work. He also planned the plantations and ordered the material for the newer Stations. The annual meetings of most of the Provincial Fruit Growers' Associations were attended by him, both in order that he might give information and be kept in touch with horticulturists and their problems in different parts of Canada.

The work in pomology at the Central and Branch Farms and Stations in 1913 consisted in the study of varieties of fruits as tested in the different experimental orchards throughout Canada; the naming of fruits sent in for identification, and the description of new fruits. Spraying and cultural experiments with fruits and vegetables were continued. At the newer Stations a considerable proportion of the orchards has been laid out with a view to more cultural work than has been possible at some of the older Farms, where the testing of varieties to find those most suited to the different climatic conditions in Canada seemed the more important work when the orchards were planned. In 1913 orchards were planted for this purpose at Kentville, N.S.; at

Ste. Anne de la Pocatière, Que.; at Cap Rouge, Que., and at Invermere, B.C. At the last named Station orchard plots for experiments in irrigation were planted.

Spraying experiments were given particular attention by the Station at Kentville, N.S., in 1913. The results obtained in the control of apple scab showed the great importance of early and thorough spraying.

Many new varieties of apples have been originated in the Horticultural Division, and scions of the best of these were distributed during the past year to different parts of Canada. The names of some of the most promising are: Melba, Joyce, Glenton, Rocket, Niobe, and Bingo.

Believing that apples of good size and quality will eventually be found which will prove hardy under trying prairie conditions, just as certain varieties which have favourable conditions are succeeding there, continued effort is being made to find or originate new sorts. The most recent method being tried on a large scale at the Prairie Farms is to raise seedlings of the hardiest known varieties, in nursery rows, and have the cold weather of winter eliminate the tender sorts before they are tested under orchard conditions. The results in 1913 were promising, individual trees showing superior hardiness.

While the apple has received most attention, other fruits have not been neglected. The value of the Senator Dunlap strawberry and the King raspberry for the colder parts of Canada was strikingly shown in 1913. Strawberries do very well on the prairies, especially if proper attention is paid to mulching. The importance of leaving the mulch on as late as possible in the spring to keep the plants from developing and to protect them from late frosts was well illustrated at the Rosthern Station in 1913, where the crop was saved in this way.

As vegetables are an important food-crop in Canada, and as a large number of persons are engaged in the production of them, they have always received considerable attention in the Horticultural Division. With an assistant to devote his time to the study of this crop it is now possible to do still more to aid the vegetable grower. In 1913, a special test was made of the same varieties of vegetables from different Canadian seedsmen to determine how many of them were true to name and true to type. It was found that there was great variation in the varieties of some kinds of vegetables from different sources, some being much better than others. Cultural methods, including several ways of training tomatoes and different distances in thinning various kinds of vegetables, were experimented with. At the Experimental Station at Fredericton, N.B., especial attention was paid to potatoes in 1913, as the potato is such an important crop in New Brunswick. A large collection of varieties was got together, and on testing them it was found that the variation in yields was very great. The best of these will be planted on a larger scale in 1914, so as to have a supply available for distribution in New Brunswick as soon as possible.

The selection of potatoes to improve varieties and types was also begun there. On all the Branch Farms and Stations vegetables were under experiment in 1913.

The breeding of vegetables is receiving particular attention at the Central Farm, much care and time being given to the selection and development of early strains. Seed of the Alacrity tomato and Early Malcolm corn, two varieties developed in the Horticultural Division, were distributed in 1913, and many favourable reports were received. Work with early strains of beans, peas, and other vegetables is in progress.

Believing that Canadians should pay more attention to the beautifying of their homes, an especial effort is being made in the Horticultural Division to obtain and disseminate information which will assist them. Large collections of hardy plants have been brought together for study, including roses, pæonies, irises, phloxes, and many other kinds of annuals, herbaceous perennials and ornamental trees and shrubs. The season of 1913 was especially favourable to annuals, and valuable notes were taken on the characteristics of a large number of varieties. In the newer parts of Canada, the experiments with flowers on the Branch Farms and Stations are very much appreciated, and there has been much favourable comment in regard to them. The professional nurserymen and florists who have now much capital invested in Canada also find very useful information in the results of the work with ornamental plants. The experiments with flowers in the new greenhouses at the Central Farm should prove of special value to those who grow flowers commercially.

Cereal Division.

After two seasons in which cereal crops were on the whole considerably below the average in quality, it is a pleasure to record that the past year was rather exceptionally favourable, in spite of some serious drawbacks in certain sections of the country.

In the Maritime Provinces the spring and summer were satisfactory, but prolonged wet weather in the autumn very badly damaged most of the late-maturing grain crops. Fields which were ready to cut at an early date were, however, saved in good condition.

In Ontario and Quebec there was a long drought over a very large area, by which the yields of grain were materially reduced, especially in all cases where seeding was late. Early-sown fields, and particularly those of early-maturing varieties, succeeded well and produced a good crop. The appearance of much of the grain in these two provinces is exceptionally bright. Spring wheat on the Central Experimental Farm produced remarkably plump, hard, bright kernels such as have probably never before been obtained in the history of this Farm.

In Central and Western Canada conditions were, as a rule, such as to give crops of cereals of rather better than average yield and quality.

IMPORTANT NEW VARIETIES.

The work in spring wheat is receiving special attention and a very large quantity of material is under study. Attention may here be called to three of the Dominion Cerealist's new varieties of early-maturing spring wheat.

Prelude.—Another season's experience with this remarkably early-ripening variety has confirmed the opinions previously expressed. It is in a class by itself and is the only wheat yet introduced which can be confidently recommended for those northern localities where Marquis does not ripen early enough to escape the first frosts of autumn. Prelude is especially recommended for rich moist soils. Under very dry conditions it produces too short straw. A large distribution of free five-pound samples of this wheat has been made during the winter, and seed has also been sold to a few farmers in lots of usually about two bushels, so as to enable them to start the growing of this variety on a somewhat larger scale.

Marquis.—For the third year in succession this extraordinary variety has won the highest award in international competitions. The successes of 1911 at New York and 1912 at Lethbridge were followed last autumn by the winning of the highest award at the International Dry Farming Congress at Tulsa, Okla. The prize in 1911 was won by an exhibit from Central Saskatchewan, that of 1912 by an exhibit from Southern Alberta, and that of 1913 from Central Saskatchewan again. No comment is necessary on such a record.

Pioneer.—This is the most recent introduction by the Dominion Cerealist from the large collection of spring wheats of his own breeding which are now being studied and compared. In earliness Pioneer comes between Prelude and Marquis. It resembles Prelude in some respects, but produces longer straw and has more ability to resist drought. At the Experimental Station at Lethbridge it has given particularly good results both on the irrigated and non-irrigated sections of the Farm. Pioneer gives a very good yield of excellent hard red kernels which produce flour of very high strength and colour. This variety is not introduced for general use, but is recommended for trial in districts where Marquis ripens too late and Prelude produces too short straw.

NEW VARIETIES OF OATS AND BARLEY.

Many new cross-bred sorts of oats and barley are under test, but the study of these grains has not yet been carried far enough to warrant the introduction of any of them. Many of the types referred to thresh out free from hull and may be of particular value on that account. Some of the barleys are beardless, and for this reason are likely to be received with particular favour.

MILLING AND BAKING TESTS.

A special assistant has been given charge of the milling and baking tests, which for a long time previously were carried on by the Dominion Cerealist personally. This change has made possible the enlargement of the work so as to test as often as may be necessary the new varieties of wheat which are being produced, as well as those obtained from outside sources, and also to test samples of wheat and flour for the general public. A very large series of investigations has been carried on in the Ottawa laboratories during this past winter.

DISTRIBUTION OF SAMPLES OF GRAIN AND POTATOES.

The annual free distribution continues to attract great attention. It is pleasant to record the fact that the appreciation of good seed is growing so rapidly that it is extremely difficult to keep pace with it and to provide each year a sufficient amount of material of such high quality as to satisfy the public taste. The distribution from Ottawa is now drawing to a close for this season. About 6,800 samples of grain and 2,300 samples of potatoes will be sent out.

Division of Botany.

The work conducted by this division during the past year may be considered under the headings of Pathological work and Botanical work in the more restricted

sense, according as it relates to plant diseases or the identification and characteristics of flowering plants.

Pathological work.—One of the most important phases of this work has been that necessitated by the discovery of Powdery Scab of the potato (*Spongospora subterranea*) in the eastern provinces of Canada. While this disease has not given indications of being a destructive one under Canadian conditions, its importance has been much augmented by the attitude taken by the United States authorities, who have considered it as sufficiently serious to warrant the placing of an embargo on Canadian potatoes, except such as have been grown in districts officially declared free from the disease, and which before shipment have been inspected and certified by a recognized official to be disease-free. It thus became necessary that a careful survey be made of the provinces in which the disease has been found or was suspected. Most of this work has now been done, and it is expected that before planting time it will be possible to make a definite statement as to what areas can be declared disease-free. The inspectors who have been doing this work have also assisted the Provincial Departments of Agriculture in training various members of these departments to recognize the disease, and in giving addresses and demonstrations dealing with it. To further meet the demand for information, a circular devoted to a consideration of the nature of the disease and its control has been prepared and will shortly be ready for distribution as Farmers' Circular No. 5 of this division.

As many points in the development of the disease are not accurately known, it is proposed to have one or two field stations established in the worst infected areas, where experiments will be undertaken to elucidate these.

The inquiries necessary in connection with Powdery Scab have shown that there is considerable ignorance and indifference on the part of potato growers in respect to the presence of disease in the tubers they use for planting. In order to assist in furnishing information on this matter, a circular has been prepared depicting in natural colours the most important tuber diseases, and containing a concise summary of practicable methods of guarding against their spread.

Much work on the fruit diseases prevalent in the Niagara peninsula has been done from the field laboratory at St. Catharines, and a bulletin is in preparation giving the results of this. An investigation was also made into the nature and distribution of apple tree cankers occurring in certain areas of New Brunswick and Nova Scotia, with particular reference to the prevalence of what is generally considered to be European Canker (*Nectria ditissima*).

Numerous inquiries have been received and advice given on diseases affecting a great variety of fruit, forage, grain, and vegetable crops.

In December the Dominion Botanist was appointed a member of the delegation entrusted with the presentation of the Canadian case at the public hearing given at Washington to representatives of foreign Governments, previous to the passing of the potato embargo regulations by the United States. In February he attended the International Congress of Phytopathology, held at Rome, as the official delegate of the Dominion.

Botanical work.—A large and increasing number of plants are annually sent in for identification. A considerable proportion of these are more or less noxious weeds

and poisonous plants, regarding the habits and means of eradication of which information is requested. Such advice is given on these matters as is possible, but it is to be noted that there is a great lack of accurate experimental data on these subjects. Something has been done on a small scale by the division in testing the utility of the application of certain chemicals and sprays to destroy weeds, but it has not been possible to conduct field experiments on any adequate scale.

An increasing number of correspondents request information on native drug plants, their habitats, cultivation and marketing. Attention has been given to this subject, and it is intended to publish accounts of the more important of these plants as opportunity occurs.

A large number of species have been added to the collection of plants in the Arboretum and Botanic Gardens, and the object of making this collection representative of all that is most interesting and instructive in the flora of the temperate climates is gradually being attained. This opportunity may be taken to thank the officials of the various Botanical Gardens throughout the world who have assisted in this direction by exchanges and donations of seeds and plants.

Division of Entomology.

The work of this division has comprised: The administration of the Destructive Insect and Pest Act; the suppression of the Brown-tail Moth and the introduction of its parasites and those of the Gipsy Moth into New Brunswick and Nova Scotia; the carrying on of investigations upon insects affecting farm, garden and orchard crops, forest and shade trees, live stock, household and public health, mills and stored products, and the answering of inquiries and the giving of advice concerning the control of such insects; the naming of collections of insects for institutions and individuals; investigations on apiculture and the furthering of its development; and the administration of an appropriation for the care of the orchards on the Indian reservations of British Columbia.

Under the Destructive Insect and Pest Act, nursery stock originating in countries in which the San José Scale occurs was fumigated at our various fumigation stations. In order to facilitate the importation of nursery stock and trees into the western provinces, a new fumigation station has been erected at North Portal, Sask., which has been made a port of entry. On account of the increasing amount of nursery stock entering Eastern Canada, and with a desire to expedite its shipment, an additional fumigation station is being erected at Montrose for Niagara Falls, Ont., and our accommodation at Niagara Falls has been increased. A large and more up-to-date fumigation station has also been erected at St. John, N.B. Over four million imported trees and plants originating in Europe, Japan and the New England States were inspected for Brown-tail and Gipsy Moth and other pests.

The Brown-tail Moth is unfortunately spreading most seriously into New Brunswick and Nova Scotia from the adjacent states. A large flight of the female moths in July last has considerably increased the infested area and the intensity of the infestation in those provinces, so that now over 9,000 square miles of Canadian territory is infested. The Gipsy Moth in Maine is now within forty to fifty miles of the New Brunswick border. By means of a force of inspectors in each of the infested prov-

inces, every effort is being made, by collecting the winter webs of the insects, to hold it in check as long as possible, and I am pleased to acknowledge the co-operation of the Provincial Governments, who employ half the number of men engaged on the work of suppression.

As the Brown-tail and Gipsy Moths will only be controlled ultimately by natural controlling factors, such as insect parasites, disease and fungous, efforts are being made to introduce and establish natural enemies while the infestation is still in the initial stage. To assist in this object two field laboratories have been established at Bridgetown, N.S., and Fredericton, N.B. Through the great courtesy of any co-operation of the Chief Entomologist of the United States Department of Agriculture, an officer was located in Massachusetts for the purpose of collecting parasitized Gipsy and Brown-tail Moth caterpillars. The parasites were bred out and shipped to the laboratory in New Brunswick and put out at points in that province and in Nova Scotia. In addition to several hundred predaceous beetles, over 50,000 parasites of three different kinds were imported and liberated, the whole being divided to form twelve colonies. We have also found one of the species successfully established in Nova Scotia.

The policy which has been adopted of establishing field or regional laboratories in different regions of the Dominion in order to investigate the most serious insect pests in the districts in which they occur is producing excellent results. My officers are securing information which is necessary as a basis for control measures, and experiments in various kinds of preventive and control measures are in progress. Two additional laboratories were established during the past year and the following is a list of the entomological field laboratories at which our entomological investigations are being carried on:—

Bridgetown, N.S.—Investigations on the Brown-tail and the introduction of its parasites and control work; Bud Moth and Green Fruit worms of apple.

Fredericton, N.B.—Control work and investigations on the Brown-tail Moth and introduction of its parasites; parasitic and natural control of native insects; the Tent Caterpillar, Fall Web-worm, Spruce Budworm.

Covey Hill, Que.—Apple insects, especially apple curculio; Grasshopper control by bacterial disease.

Jordan Harbour, Ont.—Apple Maggot; Apple Aphids; control of greenhouse pests; control of mill-infesting insects.

Strathroy, Ont.—Investigation of White grubs, Wireworms and insects affecting field crops.

Treesbank, Man.—Investigation of White grubs and chief insects affecting cereals: Hessian Fly, Wheat Stem Maggot, Wheat Stem Sawfly and Grasshoppers.

Lethbridge, Alta.—Investigation of Cutworms and injury to winter wheat involving a study of Eelworms.

Agassiz, B.C.—Completion of a study of the Strawberry Root Weevil; investigations on the Lesser Apple Worm, Budmoth and other insects affecting deciduous fruits.

It is gratifying to note, apart from the importance of the various investigations which are now being carried on throughout the country, the additional advantage resulting from the placing of trained men in different localities. They have been able personally to advise local agriculturists on insect control, and when reports of insect outbreaks reach my department it is often possible to have one of my officers investigate the matter, thus saving time and securing certainty of identification and an appropriate advice.

Material progress is being made in fruit insect investigations, and those on the Apple Maggot, the Bud Moth and Strawberry Root Weevil are nearing completion or have been completed. Special attention is now being given to the Apple Aphids, which are becoming increasingly injurious to the fruit and nursery stock. The control of White grubs has been made difficult in the past by the lack of knowledge of the identity, life histories and habits of the different species involved. In co-operation with the United States Bureau of Entomology my officers are now carrying on an international investigation, and valuable and surprising data have been already secured.

The comparative study of methods of control for root-maggots has been continued. Two of my officers investigated the Cutworm outbreak in southern Alberta and carried on experiments on control measures. I am pleased to note that this hitherto unrecorded species has been less injurious in many sections where serious damage was done in previous years. Ordinary methods of control appeared to be ineffectual owing to the peculiar habits of the caterpillars, and the investigation will be continued. The study of the possible causes of extensive killing of winter wheat in which Eelworms appeared to be a possible factor, was begun.

Owing to reports of extensive damage to timber in British Columbia through the depredations of bark beetles and other forest insects, a special investigation was made during the summer months by my officer in charge of forest insect investigations and in co-operation with the Provincial Forestry Branch. Several serious outbreaks of bark beetles were located and studied and control measures based on the investigation were recommended to the Provincial Government. The enormous commercial value of the merchantable timber in British Columbia, and the presence of serious insect outbreaks which are controllable, renders a further study of the forest insects more necessary, and arrangements for such investigations are being made. The introduction of the parasites of the Larch Sawfly from England was continued, and a shipment of heavily parasitized cocoons received in the spring was established in southern Manitoba. In Eastern Canada an abnormally severe outbreak of Tent Caterpillars was experienced. Extensive areas of woodland were stripped in Quebec and New Brunswick, and where control measures had not been adopted orchards were entirely stripped. In the cities of Montreal and Ottawa the shade trees were defoliated. An investigation by my officers of the natural control factors indicated the presence of parasites affecting the eggs and larval stages and a wide prevalence of bacterial disease in the caterpillars.

An investigation was commenced with a view to discovering a practical method of controlling house flies under rural conditions. The chief requirements are that the insecticides used to destroy the larvæ in the manure piles shall be cheap and effectual and at the same time shall not injure the fertilizing value of the manure.

The work is not sufficiently advanced to permit the publication of definite results and it will be continued during the coming summer.

The appointment of a special officer to take charge of the agricultural work has had very gratifying results. It has now been possible to begin the organization of apiculture on the Branch Farms throughout the Dominion. With a view to securing varieties of bees which were suitable to Canadian conditions and resistant to bee-disease, breeding experiments were commenced, and for this purpose queens were imported direct from Italy, Switzerland and Austria, and also from the United States. I am pleased to record the increased attention which is being devoted to this important branch of agriculture throughout the country.

In addition to paying the necessary visits to various parts of the Dominion in connection with the investigations which my officers are carrying on, the Dominion Entomologist visited the states of Oregon, California and Utah in October to study the entomological methods employed in those states and to inquire into the occurrence of the Potato Tuber Moth in California, and the Alfalfa Weevil in Utah, with a view to ascertaining what protective measures it was necessary for us to take to prevent the introduction into Canada of these serious pests which have been introduced into the United States and have entailed very serious losses to the agriculturists. Owing to the repeated discovery of potatoes imported into British Columbia from California which were seriously infested with the larvæ of the Potato Tuber Moth and the impracticability of preventing its introduction by inspection and fumigation, the importation of California potatoes was prohibited under the Destructive Insect and Pest Act by an Order in Council passed March 7.

The importation of nursery stock, except certain classes of florists' stock, through the mails has also been prohibited.

The officers of the division have given addresses before agricultural, forestry and other conventions on the control of insect pests, and exhibitions have been arranged at Ottawa, Winnipeg and elsewhere. Several bulletins and circulars have been issued during the year.

Division of Forage Plants.

The work carried out by the Division of Forage Plants can be classified as follows:—

1. Variety tests, aiming to ascertain the comparative value of different already established varieties of the various cultivated forage plants.

2. Breeding work, the object of which is to produce new varieties of cultivated forage plants superior to those already in existence and better suited to the various climatic conditions in different parts of the country.

3. Investigations on wild grasses and kindred plants.

VARIETY TESTS.

During the year a number of varieties of Indian corn, mangels, turnips, carrots and sugar beets were tested, on the Central Experimental Farm as well as on the Branch Farms.

Each variety was grown in duplicate plots situated in different parts of the field, and the yield per acre calculated from the average yield of the two plots. By this arrangement, which was introduced during 1913, the disturbing influence of variation in the character of the soil in the experimental field is eliminated, at least to a certain extent. The value of duplication as a means of bringing about truer results in comparative test work was amply demonstrated at all the Experimental Farms and Stations, even on those where the soil was most uniform in character.

BREEDING WORK.

Alfalfa.—Owing to very unfavourable weather conditions during the spring of 1913, the alfalfa plots were partially killed. Working from the supposition that those plants which were able to survive represent the hardiest types, most of the plots were allowed to go to seed. Part of the seed thus obtained will be used during 1914 for further breeding work.

In order to secure a hardy and, at the same time, uniform variety of high yielding capacity, breeding from individual plants was also started. For this purpose about one thousand plants were secured and transplanted in the field.

Clovers.—With a view of securing, through natural selection, perfectly hardy types of clovers, an experiment consisting of a total of twenty-four plots and eighty-four rows was started with Red clover and Alsike. The object of this experiment which is to be continued during a number of years is not only to produce biological varieties characterized by resistance to cold but also to demonstrate, by actual figures, the value of home-grown seed.

Breeding of high yielding strains from individual plants possessing outstanding morphological characters, indicating high yielding power, was also started. For this purpose a starting material of about nine hundred individual red clover plants was secured.

CULTIVATED GRASSES.

From among twelve hundred individual timothy plants, planted during 1912, seventeen individuals were selected. They were self-fertilized and produced a fair amount of seed which next year will be used as stock seed for new varieties.

Animal Husbandry Division.

The work of this division during the past year has expanded rapidly and most satisfactorily. The scope of its work briefly is the laying out and superintending of the feeding, breeding, purchasing, management and housing of farm animals, manufacturing and marketing of their products, together with all routine and experimental work connected therewith, on the Central and Branch Farms and Stations in consultation with the Director of the Experimental Farms and the Superintendents of the various Farms and Stations.

The work on the Central Experimental Farm, Ottawa, during the past year was seriously handicapped by the loss of some of the most important buildings by fire.

These buildings included the main dairy barn, bull and calf barns and steer barn, together with silos, paddocks and scales connected therewith. Fortunately no cattle were lost, due to the prompt efforts of all the Farm employees. Nevertheless, all live stock experimental work on the Central Farm was discontinued, owing to the lack of appliances, necessary crowding and rearrangement of the stock in all departments.

LIVE STOCK ON THE CENTRAL FARM.

The horses on this Farm are all of draught type, except the necessary drivers. During past years geldings only were kept, but in the last two years it has been the policy to replace at least half of the geldings with mares and to commence breeding operations with the object in view of acquiring further data regarding horse rearing. During the past year one foal was reared. The numbers of mares have been increased, until now there are eight high-class Clydesdale mares, the most of which are in foal.

Beef cattle work with the present limited farm area must of necessity be confined to feeding experiments in the finishing of steers, no breeding stock being kept. The loss of buildings and feeds contained eliminated the steer feeding experimental work.

Dairy cattle are receiving increased attention. Representatives of five breeds, Holstein, Ayrshire, Guernsey, Jersey, and French Canadian are maintained, all of which have shown excellent returns. Milk production was naturally largely diminished when the buildings were lost and the cattle kept for several weeks in the open. Many pure-bred animals from these herds are annually sold for a moderate price, and are in great demand by farmers in all parts of Canada. In addition a number of valuable animals have, during the past year, been sent to certain of the Branch Farms to help build up herds at these points. In one instance twelve head of pure-bred Ayrshires went to one point alone, the Experimental Station at Ste. Anne de la Pocatière. Experiments in the breeding and feeding of dairy cattle are rapidly being extended.

Sheep have been increased in numbers, and improved in quality and condition during the past year. This is in some measure the result of the utilization of our farm roadsides for pasture. This was in our case imperative owing to the unhealthy condition of the very small areas formerly used as sheep pastures. It must be admitted, however, that this method of herding is far too expensive to be commonly practised throughout Canada. Owing to the limited areas, only two breeds are maintained, Shropshires and Leicesters, but from these flocks a number of exceptionally fine breeding animals were distributed to the Branch Farms and to farmers.

Swine raising has again demonstrated itself as one of the best paying branches of the live stock work. Yorkshires, Berkshires, and Tamworths have been kept, from which herds again large numbers of young pure-bred animals have been sold for breeding purposes. Although most of the feeding experimental work with swine was discontinued owing to the utilization of part of the piggeries for the cattle, yet a few valuable experiments have been conducted during the past year.

Much experimental work has been conducted to determine, if possible, the most advantageous methods of producing and marketing dairy products. A few new lines have been added to this work, and the returns from the manufacturing of butter, Cheddar cheese, several kinds of soft cheeses, including cream and Coulommier cheese,

pure milk and certified milk, have been most satisfactory. This department of the Experimental Farm alone has shown gross receipts of over $11,000. The testing for efficiency and economy of various types of milk pails, two types of milking machines, and many correlated problems in dairy work, were well under way, but unfortunately had to be postponed owing to the loss of buildings and equipment. With the completion of the new buildings and their full equipment, this work will be taken up again, and it is hoped that much information of economic value will be acquired.

BUILDINGS FOR ANIMAL HUSBANDRY DIVISION, EXPERIMENTAL FARM.

During the summer of the past fiscal year a small amount of building to improve the facilities of this division was conducted. This included the repairing and renovating of part of the barns which were later destroyed by fire. There was also erected a cheap but efficient shed for the feeding of sheep on experimental work. A cottage was moved from its old site to provide a site for a dairy building which will probably be erected during the coming year.

Immediately after the fire which destroyed the above-mentioned barns, work was commenced in the clearing away of refuse and the relaying of new foundations on the same site. The work of rebuilding was hastened to such an extent that the two large wings of the main barn were closed in before the end of the calendar year, thus providing good shelter for a large part of the dairy herd. With the completion of these new barns during the coming year there will be at the Central Farm one of the best dairy barns in Canada, which will undoubtedly be studied carefully by the many farmers visiting this Farm.

ASSISTANCE GIVEN TO BRANCH FARMS.

By visiting the Branch Farms throughout Canada the Animal Husbandman has been brought more closely in touch with their work. This has already tended to assist the Superintendents under the supervision of the Director in laying out new lines of live stock experimental work and in better conducting and systematizing such work as has been in progress for some time.

The work of planning the new barns and other live stock buildings required for the Branch Farms and new Stations has also been done largely by the Animal Husbandry Division. In many cases the buildings, under the direction of the Director, were planned almost in all details by this division, but in most cases the general layout, together with the necessary details, was submitted to the Public Works Department. Through this means of co-operation, building work on the Branch Farms was largely facilitated during the year, and many cheaply constructed but thoroughly satisfactory farm buildings were completed and are now in use as reported elsewhere. These improved buildings on the Branch Farms not only have given better facilities for the conducting of live stock experimental work, but have already shown a marked beneficial influence on the farmers of the neighbourhood and province, wherein the Farms are situated, in that these buildings are being copied, in their essentials at least, by a large number of both small and extensive stock breeders.

The Poultry Division.

Since the 1912 report the Poultry Division has been reorganized and placed in a position similar to that of the other divisions on the Experimental Farm, with a Dominion Poultry Husbandman in charge. The work of the division also is extended to the various Branch Farms and Experiment Stations.

Prior to 1913, no poultry, except for local use, was kept at the Branch Farms, but during this year poultry work has been added to the following Farms and Stations: Agassiz, B.C.; Invermere, B.C.; Lacombe, Alta.; Indian Head, Sask.; Brandon, Man.; Fredericton, N.B.; Nappan, N.S.; Kentville, N.S.; Charlottetown, P.E.I.

The plant and equipment at the Branch Farms and Stations consist of several acres of land, preferably in or at the edge of the orchard, from 100 to 400 laying hens and various styles of houses to accommodate these; incubators and brooders to rear enough birds to replenish the laying stock and have some for sale to farmers for breeding purposes. At most of the plants there is a man appointed to take charge of the poultry and bees, and it is expected that before another year each Branch Farm and Experiment Station will have a well-equipped poultry plant large enough for one man to handle, with a good practical poultryman in charge.

Practically all the experimental work is being carried on at the Central Farm, as here more equipment is provided for the purpose, but experiments of a special or local character are being conducted at the Branch Farms, and through these Branch Farms the methods that have proven satisfactory and advocated by the division will be demonstrated.

The experiments this year have included a continuation of those reported in 1912, namely, the open and closed front houses, feeding for egg production, feed best suited for brooder chicks and rearing stock. The findings have further emphasized the value of fresh air in the poultry house, and have shown that a dry cold is not detrimental to the health of the laying stock. This was especially indicated during the winter of 1913-14. A pen of Single Comb White Leghorns was kept in a 10 by 14 house, the front or south side of which was one-third glass and two-thirds cotton. During three days when the maximum temperature registered thirty, twenty-eight and twenty-five degrees below zero the birds did not suffer because of the extreme cold and comparatively open house, which was evidenced by the fact that there was not a frozen comb among the females, nor did the egg-yield diminish during the cold snap. These temperatures are too low to keep male birds from freezing, and experiments are being conducted to determine the best means of keeping their combs from freezing during the cold dips.

The various feeding experiments above referred to are still being continued, results of which will be published in bulletin form as they are completed.

Among the new experiments this year are: Pedigree work to show the value of heredity in egg production; causes and remedies for mortality among incubator and brooder chicks; investigation of poultry diseases; value of Indian Runner ducks to produce table eggs; value for poultry food of screenings and weed seeds as taken from the elevators at Port Arthur; artificial hatching of Turkey eggs; turkey rearing and their diseases; goose and duck culture, etc.

Laying strains of several utility breeds are being developed at the Central Farm, the cockerels from which are supplied the Branch Farms and Experiment Stations. Practically no eggs or stock are being sold from the Central Farm, but as soon as the Branch plants have developed their departments, stock and eggs from them will be available to the farmers and poultrymen.

During the year three new buildings have been erected at the Central Farm: A cockerel house 10 by 70 feet; an experimental breeding house 12 by 100 feet; an experimental feeding house and supply house 30 by 40. There has also been added to the plant a fourteen-acre section of park land on the edge of Dows lake, which will be utilized for turkeys and waterfowl experiments.

Tobacco Division.

The experimental work of the Tobacco Division was continued during the season of 1913-14 on the Experimental Stations at St. Jacques l'Achigan and at Farnham, in the province of Quebec, and at Harrow in Ontario, in addition to the work carried on at the Central Experimental Farm, Ottawa.

As in former years, the area at the Central Farm used for experimental work with tobacco was especially devoted to the production of seed for distribution. The number of varieties cultivated and studied was considerably increased in view of certain work in breeding and selection begun this year, from which it is hoped to establish and maintain in Canada types of a superior quality and of a more fixed character. The results of this work in 1913 were most encouraging, in spite of a rather unfavourable season, especially with the yellow tobaccos, certain varieties lately introduced proving earlier in ripening than any so far tried in Canada.

An abundant crop of seed enabled the division to fill practically all requests for samples. The total number sent out was about 4,000.

The crop of tobacco at the St. Jacques l'Achigan Station, as at all points in the north central part of Quebec, was considerably reduced by drought and by the cold weather which prevailed during most of June. The leaf was short and a little too thick for first-class wrappers. However, in spite of the growth being kept back at first, the crop ripened well and was of good colour. The varieties grown were Comstock, Aurora and Cuban.

At Farnham, owing to the greater size of the Station, the amount of experimental work was larger. The varieties tested were Comstock, Spanish, Havana Seed Leaf, Yamaska, Big Ohio x Sumatra, Cuban and Canelle.

Among these, those giving the most interesting results were the Comstock, Havana Seed Leaf and Yamaska. The Cuban and the Brazil, owing to unfavourable weather conditions soon after transplanting, gave a crop rather uneven in development and scarcely mature. The Big Ohio x Sumatra, though giving good results on well-cultivated land, did not seem to do so well on land freshly broken, especially from old meadow. The Yamaska gave a crop of good texture and of uniform development. There was a very large proportion of a length suitable for wrappers (20-inch to 24-inch), and it seemed better acclimatized and more fixed in type than the Big Ohio x Sumatra.

Unfortunately, an early frost completely destroyed some 2,500 plants which had been selected for seed on different parts of the plantation. This, in addition to the destruction of the seed itself, delayed a year the work of individual selection and hybridization, which was in progress.

The tobacco crop on the Station at Harrow, Ont., was completely destroyed by the hail storm of August 3, 1913. This prevented the publication of the results which it was hoped to obtain from a systematic test of chemical fertilizers on tobacco. In yellow tobaccos, it was impossible to draw conclusions with any degree of certainty, from the comparative test of known varieties, as to their earliness and tendency to produce a leaf of the desired colour.

In the work of sorting the crop grown at St. Jacques l'Achigan, carried on at the Central Farm, Ottawa, a considerable saving of labour was effected by the use of graduated tables much more simple to handle than those employed at Farnham and St. Cesaire.

Experimental Station, Charlottetown, P.E.I.

The season was a late one, owing to dull and cold weather in May and June. The season was, on the whole, favourable to large yields and, for the early grain, the harvesting weather during September and early in October was good. The latter part of October was very wet and little of the later grain was saved until November, much of it in a damaged condition. Fruits and vegetables gave very good returns.

With the exception of some portable poultry houses and small outbuildings, no new buildings were erected at the Charlottetown Station this year.

Experimental Station, Fredericton, N.B.

The only experimental work carried on at this Station during the year was a series of tests of fertilizers on potatoes. Efforts were concentrated on clearing breaking and draining, and on the erection of buildings. Of the latter, a horse barn was got well under way, while a cattle barn and a dairy barn have been completed, except painting. Building operations will be continued during the coming year, and it is hoped to carry on considerable experimental work as well.

Experimental Farm, Nappan, N.S.

The growing season at Nappan was rather a backward one. Seeding commenced somewhat earlier than in 1912, but subsequent cold wet weather made germination slow. August and September were favourable for growth and for the harvesting of early-sown grains, but that sown later was harvested when the rains of October set in, making much of it almost unfit for feed.

The apple crop was below the average in quantity and quality, due, no doubt, to lack of sunshine.

Experimental Station, Kentville, N.S.

Although warm weather during April started growth early, cold weather following retarded its progress during the first half of May, and the average temperature during May, June, July and August was below normal, while the rainfall was unusually light, the crops suffering considerably from lack of moisture.

Some 14½ acres were set out in orchard, and plantations of grapes and small fruits were made. Ornamental trees and shrubs were also planted and an area seeded down for lawns.

The demonstration orchard work begun last year was carried on.

Clearing and breaking were continued and some field crops grown, although no experimental work with cereals was attempted.

Experimental Station, Ste. Anne de la Pocatière, Que.

Preparatory work at this Station was continued in the way of draining and fencing, and field crops were grown, principally Banner oats.

The land area at this Station was increased by about 125 arpents during the year.

The spring was very dry which, with the depth to which the frost had reached, delayed vegetation considerably. Temperatures throughout the season were below normal. Some 3½ acres were planted in orchard, and further plantations will be made during the coming year.

A horse stable and cow barn were erected during the year, and are complete with the exception of painting.

Building, draining and fencing operations will be continued next year and some experimental work begun.

Experimental Station, Cap Rouge, Que.

Spring opened very early and all trial plots of cereals were sown by the end of April. Later-sown grain suffered from drought but that sown early gave a heavy crop throughout the district. Results in horticulture were very good.

During the year a horse stable was built and a water system installed.

A considerable area was tile-drained in the autumn, a gasoline traction ditcher being used to do the trenching in large part.

Experimental Farm, Brandon, Man.

The spring of 1913, while not early, was not retarded by cold weather, and seeding made rapid progress. While the dry summer prevented heavy crops being harvested, the yield was a good average one, of excellent quality.

During the year a piggery, a cottage and an office building were erected.

Experimental Farm, Indian Head, Sask.

Seeding commenced about the middle of April under favourable conditions, and growth was rapid. The crop ripened early and was cut without damage from frost. Most of it was threshed before the rains set in in October.

Considerable improvements were made in the ornamental grounds, and new plantations of fruit trees were made.

A cottage for the herdsman was built this year.

Experimental Station, Rosthern, Sask.

The season of 1913 was drier than either 1911 or 1912.. Crops did not suffer to any extent, however, as there was considerable rainfall during July and August. They were harvested in good condition without damage from frost.

Experimental Station, Scott, Sask.

The season here opened early, grain being sown on April 8. Although cool, dry weather followed, there was sufficient moisture in the soil for good growth. Harvest was early and favourable; fall weather permitted threshing to be completed without delays. The yield was a fair one throughout the district, and the quality excellent.

An experimental building was erected this year and electric lights installed in all the buildings on the Station.

Experimental Station, Lethbridge, Alta.

Most of the experimental work on the "dry farm" was, as usual, duplicated on the irrigated land. In the former case, dry weather in May and June did considerable injury to the crops both on the Station and throughout the district. The results with vegetables and small fruits were good, and apples were borne on some eighty-five trees, the first produced on the Station, with the exception of a small crop off one crab tree last year.

No buildings were erected this year. A septic tank was installed. The Station buildings were wired for electric lighting, and a water system was put in.

Experimental Station, Lacombe, Alta.

Seeding commenced on April 10, and although cool and dry weather followed until May 10, the weather after that was most favourable for growth. These favourable conditions continued throughout the season until harvesting and threshing were finished.

Small fruits and vegetables did well, and the first apples on the Station were produced this year.

No new buildings were erected at the Lacombe Station. Fairly extensive dairying operations were carried on, as well as feeding for beef, and work with poultry.

Experimental Farm, Agassiz, B.C.

The season at Agassiz was wet and cool, hence the cereal crops were not of as good quality as would otherwise have been the case.

An orchard of about four acres was planted and the usual variety testing of vegetables and fruits carried on.

The dairy herd did well, as did also the swine and the poultry.

Some small buildings were erected, such as an apiary shed, poultry houses, sheep shed, etc.

Experimental Station, Invermere, B.C.

Some 700 trees were planted here and preparations made for further plantations next year.

No experimental work with cereals was carried on, but some field crops were grown.

A house for the superintendent and one for the foreman were put up.

Experimental Station, Sidney, B.C.

Clearing operations were continued, some 50 acres being cleared, stoned, levelled and ploughed. Extensive draining operations were carried on, together with fencing and laying out of avenues and roads.

Large plantations of ornamental trees and shrubs, both imported and native, were made, and some experimental work with vegetables and small fruits carried on.

Substations.

Experimental work was carried on at Grouard, Fort Resolution and Fort Providence, in Alberta, and at Kamloops in British Columbia. With the exception of the last-named the results were satisfactory at these points, considering the difficulties due to situation and climate.

FIELD CROPS OF THE DOMINION.

There was a marked difference between the weather conditions in the western and in the eastern portions of the Dominion during the growing season of 1913.

In the west, conditions for sowing, growth, harvesting and threshing were most favourable, the only drawback being a rather light rainfall in some localities.

In Ontario, Quebec and parts of the Maritime Provinces, on the other hand, the crops were adversely affected by drought and by rainy weather during harvest.

Taking the Dominion as a whole, the principal grain crops show a markedly increased yield over 1912, while hay, clover, roots and potatoes show a decrease.

Of the following tables compiled from data given by the Census and Statistics Monthly, the first gives the areas and the final estimates of yield and value of the principal field crops of Canada for 1913. In the second table, the same data are given for 1912, for purposes of comparison. It will be seen that, in 1912, from a total area under field crops of 42,216,820 acres, a harvest was obtained valued at $635,473,100 while in 1913 there were produced from 46,390,430 acres, crops worth $709,230,500.

Areas and Estimates of Yield and Value of Field Crops, 1913.

Crop	Area.	Yield per Acre.	Total Yield.	Weight per Bushel.	Average Price.	Total Value.
	Acres.	Bushels.	Bushels.	Lbs.	$	$
Fall Wheat	970,000	23.29	22,592,000	60.25	0 80	18,185,000
Spring Wheat	10,045,000	20.81	209,125,000	60.37	0 66	138,277,000
All Wheat	11,015,000	21.04	231,717,000		0 67	156,462,000
Oats	10,434,000	38.78	404,669,000	36.48	0.32	128,893,000
Barley	1,613,000	29.96	48,319,000	48.41	0 42	20,144,000
Rye	119,300	19.28	2,300,000	55.66	0.66	1,524,000
Peas	218,980	18.05	3,951,800	60.00	1.11	4,382,000
Buckwheat	380,700	21.99	8,372,000	50.32	0.64	5,320,000
Mixed grains	473,800	33.33	15,792,000	44.74	0 55	8,685,000
Flax	1,552,800	11.30	17,539,000	55.79	0 97	17,084,000
Beans	46,600	17.19	800,900	59.70	1.88	1,505,000
Corn for husking	278,140	60.30	16,772,600	56.27	0.64	10,784,300
Potatoes	473,500	165.88	78,544,000		0.49	38,418,000
Turnips, &c	186,400	358.30	66,788,000		0.28	18,643,000
Hay and Clover	8,169,000	1.33 (ton)	10,859,000		11 48 (ton)	124,696,000
Fodder Corn	303,650	8.62	2,616,300		4.78	12,506,000
Sugar Beets	17,000	8.71	148,000		6 12	906,000
Alfalfa	93,560	2.54	237,770		11.85	2,816,200

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AREAS AND ESTIMATES of Yield and Value of Field Crops, 1912.

Crops.	Area.	Yield per Acre.	Total Yield	Weight per Measured Bushel.	Average Price.	Total Value.
	Acres.	Bush.	Bush.	Lbs.	$	$
Canada—						
Fall wheat	781,000	20·99	16,396,000	60·21	0·84	13,735,000
Spring wheat	8,977,400	20·37	182,840,000	58·90	0·60	109,787,000
All wheat	9,758,400	20·42	199,236,000	59·22	0·62	123,522,000
Oats	9,216,900	39·25	361,733,000	35·40	0·32	116,996,000
Barley	1,415,200	31·10	44,014,000	47·59	0·46	20,405,000
Rye	136,110	19·06	2,594,000	54·84	0·73	1,904,000
Peas	250,820	15·04	3,773,500	56·88	1·26	4,771,800
Buckwheat	387,000	26·34	10,193,000	47·62	0·62	6,337,000
Mixed grains	522,100	34 38	17,952,000	44 48	0·59	10,690,000
Flax	1,677,800	12 92	21,681,500	54·88	0·91	19,626,000
Beans	59,800	17·40	1,040,800	59·05	2·20	2,291,500
Corn for husking	292,850	56·58	16,569,800	55·67	0·62	10,325.400
Potatoes	472,400	172·19	81,343,000		0·39	32,173,000
Turnips, &c	217,400	402 51	87,505,000		0·23	20,713,000
		Tons.	Tons.		Per ton.	
Hay and clover	7,633,600	1·47	11,189,000		11·07	124,009,000
Fodder and corn	287,740	10 26	2,858,900		4·74	13,557,500
Sugar beets	19,000	10·74	204,000		5·00	1,020,000
Alfalfa	111,300	2·79	310,100		11·65	3,609,900

LIVE STOCK.

In live stock, as will be noted in the following table, an increase in numbers is recorded, except in the case of swine. For comparative purposes, the figures are given for 1909-1913, inclusive.

NUMBERS of Farm Live Stock, 1909-1913.

Live stock.	1909.	1910.	1911.	1912.	1913.
	No.	No.	No.	No.	No.
Canada—					
Horses	2,132,489	2,213,199	2,595,912	2,692,357	2,866,008
Milch cows	2,849,305	2,853,957	2,594,179	2,604,488	2,740,434
Other cattle	4,384,779	4,250,963	3,939,257	3,827,373	3,915,687
Sheep	2,705,390	2,598,470	2,175,302	2,082,381	2,128,531
Swine	2,912,509	2,753,964	3,610,428	3,477,310	3,448,326

HEALTH OF ANIMALS BRANCH.

CONTAGIOUS DISEASES DIVISION.

The officers of this branch have been engaged in the control of outbreaks of contagious disease, the inspection of all animals entering Canada, with the mallein testing of all horses not accompanied by satisfactory certificates of such test, the inspection of animals for export by sea, the supervision of the cleansing and disinfection of stock cars at large traffic centres, under the Animal Contagious Diseases Act, and the inspection of animals, meat and meat products in packing houses under the provisions of the Meat and Canned Foods Act.

Owing to the reappearance of Foot and Mouth Disease in Great Britain, it was necessary to reimpose, on November 17, the restrictions against the issuing of permits for importations of ruminating animals and swine therefrom. Subsequent developments indicate that it will not be possible to issue permits for some time to come.

Glanders shows a most gratifying decrease of nearly 50 per cent over last year's figures, the decrease being most marked in the western provinces where the disease has given so much trouble for many years and where 310 horses were slaughtered as compared with 604 in 1912-13. In Saskatchewan the figures have dropped from 722 in 1911 to 428 in 1912, this proportionate decrease being continued in 1913 when the total was 190. The number of horses slaughtered in the Dominion was 350, as compared with 638 last year. This result has only been achieved by most strenuous exertion on the part of our veterinary inspectors, who are often compelled to travel many hundreds of miles, in all sorts of weather, and to exist in the most primitive circumstances, when endeavouring to eradicate an outbreak among the horses of settlers living many miles from a railroad. All horses entering the country are either tested before being shipped or upon arrival at the boundary, and this ensures that the heavy expense of slaughtering and paying compensation for Canadian horses is not nullified by the reintroduction of infection from outside sources where compensation methods do not prevail.

Dourine has unfortunately been found to a marked degree in one district in southern Alberta, and the slaughter of probably 450 horses will be involved. The diagnosis of this insidious disease has hitherto been possible only by clinical examination, but our Pathologist in charge of the Veterinary Research Laboratory at Lethbridge, Dr. A. Watson, has been using a method of serum diagnosis which has proved of the very greatest benefit, and enables the disease to be successfully eradicated from infected herds, whether animals show symptoms of the disease or not. Many hundreds of tests have been made, and it is hoped that once the present large local outbreak is disposed of only the usual few isolated cases will be discovered. During the year 465 horses were destroyed, all in Saskatchewan and Alberta, as compared with 18 last year.

Mange in cattle and horses has been given the special attention of our veterinary officers in Alberta and Saskatchewan, who have also had a corps of range riders under them searching for infected animals on the open range. A large amount of dipping, both voluntary and at the order of the department, has been done. Horse Mange has been somewhat more prevalent in Ontario, and there has been a slight increase in the western provinces. The total number of horses found affected was 300, as compared with 126 last year, 1,500 animals being quarantined as against 712 last year. Cattle Mange has again shown a gratifying decrease, the number of animals found affected being 2,825, as compared with 3,321 last year, while it was only necessary to quarantine 67,500 as compared with 82,677 in 1912. The disease having been completely eradicated in the northern portion of the area under quarantine restrictions in Alberta, it was possible to lessen the quarantined area by the removal of the northerly boundary six townships south. If continued progress is made, further action along this line may be possible.

Sheep Scab fortunately continues to be practically non-existent, as only one small outbreak of the disease, in the province of Quebec, in which four animals were infected, was discovered. The disease was successfully eradicated and Canada is at the present time entirely free from this disease. Many thousands of sheep were imported in the western provinces and, as a precautionary measure, a thirty-day quarantine was imposed on all except those imported for immediate slaughter.

Hog Cholera, I regret to say, still occupies a large share of the attention of my officers, due to the persistence with which uncooked garbage is fed by some owners. Compensation is withheld in such cases as deliberate disregard of warnings is evident, but unfortunately in the majority of instances the outbreak is widespread before action can be taken. The disease has been largely reduced in Eastern Canada, but in the western provinces there is a marked increase. The policy of compulsory slaughter and disinfection of premises is being energetically followed, and I trust that the figures for the next year will show a marked decrease. It is interesting to note that while the value of hogs dying or slaughtered on account of Hog Cholera in Canada during the past year is well under $100,000, the value of hogs lost in the United States from this cause in the same period is estimated at $100,000,000. During the year, 9,950 hogs, as compared with 8,466 last year, were destroyed, at a cost of $60,500 in compensation, as compared with $52,785.94 during 1912.

Rabies has given very little trouble, it being only necessary to quarantine 100 animals, of which 58 were dogs, in Ontario, and 20 dogs in British Columbia.

Tuberculosis has, as in former years, been dealt with only by testing import and export cattle for breeding purposes, those placed under the supervision of this branch, those exported for breeding purposes to British Columbia, and by furnishing tuberculin free of charge to private practitioners on condition that they report the results of tests on charts supplied for the purpose; 5,050 tests were applied by officers of this branch, as compared with 3,034 the previous year, the percentage of reaction being 8 per cent against 1½ per cent in 1912; 4,750 tests were applied by private practitioners, as compared with 3,839 the previous year, the percentage of reaction being 7 per cent, as compared with 4 per cent in 1912.

Dr. Hadwen has been engaged in work in connection with Redwater at the Research Laboratory at Agassiz, B.C., while Dr. Watson, at Lethbridge, has succeeded in establishing a satisfactory serum test for Dourine, which has proved most useful.

A new Quarantine Station has been established at Northgate, Sask., to facilitate the entry of animals over the new railway entering Canada at that point.

Land has been purchased near Lévis, Que., for a new Animal Quarantine Station at that point, and every effort is being made to have up-to-date buildings constructed in time to cope with importations oversea.

At the request of the Provincial Government of Prince Edward Island, a system of inspection of all foxes entering that province has been inaugurated, with a view to protecting the health of the valuable animals used in connection with fur raising. Blackleg and Anthrax Vaccine have been prepared at the Biological Laboratory, and sold to the public at a nominal cost. A very large demand for the former has been experienced, while the absence of outbreaks of Anthrax has fortunately limited the applications for the latter vaccine.

Examinations of the water supplies in the various public buildings in Ottawa have been periodically made and the results transmitted to the Public Works Department, while assistance has also been rendered to the Finanace Department in connection with the examination of the results accruing from the various methods of sterilizing bank notes.

MEAT AND CANNED FOODS DIVISION.

The officers of this division have had an exceedingly busy year.

The slaughter of cattle shows an increase of approximately 75,000 over the preceding twelve months.

The increase in the slaughter of hogs reached about 200,000, which is due alone to increased production in the western provinces, as the slaughter in Ontario and the east shows a decrease of 154,000, which is met by an increase of 354,000 in Manitoba and the west.

The slaughter of sheep also shows an increase of about 47,000.

Good prices were paid to producers for meat food animals throughout the year.

Owing to the increased amount of work and the advancement in our methods of inspection it became necessary to increase the number of inspectors, both veterinary and lay.

The demands for meat foods that have passed inspection are increasing rapidly, so much so that it is somewhat difficult to estimate future needs.

The managements of the different establishments have shown a commendable desire to observe the requirements of the Act and the regulations. Our instructions concerning sanitary conditions are being well observed.

Large expenditures are being made in renovating some of the older plants in order that they may be brought into conformity with requirements.

Establishments which have been recently completed have been construct d in accordance with the latest sanitary ideas and are a credit to their owners and to the Dominion.

Many new establishments engaged in packing fruit and vegetables have been erected during the past year and have been in active operation.

Weather conditions for the production of fruit and vegetables were favourable, in consequence of which there was a large pack of this class of food, with a corresponding lowering of prices for the finished article.

THE PUBLICATIONS BRANCH.

By the distribution of the reports and bulletins prepared by the purely agricultural branches of the department and by preparing and issuing the "Agricultural Gazette of Canada," the Publications Branch is charged with presenting to the public the activities of the Department of Agriculture.

Up to the 17th November, 1913, this branch embraced the work of the Canadian Commissioner of the International Agricultural Institute, after which date the division of the latter was separated therefrom. This report, therefore, has reference only to the work of the Publications Division until the separation occurred, and the Publications Branch thereafter.

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During the year there were sent to the respective mailing lists fifty-four new publications of the Department of Agriculture, two evidences given before the Select Standing Committee of the House of Commons on Agriculture and Colonization, besides small editions of the three monthly bulletins issued by the International Agricultural Institute at Rome. The publications thus sent out included eight reports, twenty-eight bulletins, ten circulars, eight pamphlets, three leaflets, twelve numbers of the Canadian Compilation of International Agricultural Institute publications, and three numbers of the Agricultural Gazette of Canada. Besides publications sent to persons on the mailing lists many, both old and new, were mailed in response to day-to-day applications.

The total number of pieces mailed numbered 1,069,433, made up as follows: To mailing lists, 180,548 copies of reports, 542,350 copies of bulletins, including evidence and monthly publications, and 93,000 copies of circulars and leaflets; to individual applicants, 13,465 reports, 196,553 bulletins and 9,082 circulars and leaflets, and to Branch Farms and Stations and other outside Government offices, 5,640 reports, 26,126 bulletins and 2,670 circulars and leaflets.

Early in the year a reclassification of the Experimental Farm's mailing list was undertaken. Heretofore this list, which contains some sixty thousand names, included farmers, gardeners, and others engaged in all kinds of agriculture. The reclassification undertaken has been to distribute these amongst the other lists, which are subject lists, so that only subject lists would be maintained. The method of reclassification has been by correspondence. Double post cards were mailed to the names on the Experimental Farms' list. The return portion provided for the expression of a preference of subjects. As these are received the respective address stencils are transferred from the original list to the list or lists desired. Owing to the failure of many to respond to the first appeal the sending of a second card has been necessary, entailing much extra labour.

During the year three new machines for addressing, blanking and the embossing of address stencils have been installed and are giving satisfaction.

Much work in multigraphy has been done. For every new publication issued there has been a press notice prepared and sent out to about six hundred news and agricultural papers. These, together with a number of circular letters, made a total of forty-five thousand copies thus printed and distributed.

An unusual duty during the late months of the year was the commencement of distribution of the book "Fodder and Pasture Plants" to public schools, agricultural schools and colleges, and agricultural officials. As the addressing could not be done by machinery and as each copy required to be stamped inside and the institution's or the official's name entered therein, extra hands had to be employed.

The Agricultural Gazette of Canada made its first appearance in January, 1914. This is a monthly publication designed to chronicle the activities of the Dominion and Provincial Departments of Agricultural and other duly organized agricultural bodies, and to review agricultural legislation in Canada.

The permanent staff employed in the Publications Branch included six clerks for the year, three clerks for three and a half months, two messengers and two packers for the year and the services of temporary help equal to almost five continuous employees.

III.—PATENTS OF INVENTION.

The following tables show the transactions of the Patent Office, Department of Agriculture, from April 1, 1913, to March 31, 1914:—

Applications for Patents.	Patents and Certificates Granted.			Caveats.	Assignment of Patent	Notices under Section 8.
	Patents.	Certificates.	Total.			
8,359	7,918	1,323	9,241	354	3,432	927

PATENT OFFICE FEES FOR YEAR 1913-14.

Month.	Notices.	Patents.	Assignments.	Certified Copies.	Caveats.	Sundries.	Subscriptions.	Total.
1913.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April	172 00	17,394 55	643 30	352 20	165 15	13 75	83 20	18,824 15
May	174 00	16,821 65	666 95	278 27	162 50	27 00	45 95	18,176 32
June	159 00	17,554 42	699 60	263 05	160 85	18 24	28 90	18,884 06
July	156 00	17,226 73	554 05	311 45	180 00	32 00	21 20	18,481 43
August	131 90	15,398 35	639 80	226 70	105 00	10 50	15 80	16,528 05
September	122 00	15,629 77	509 45	371 40	160 15	6 00	19 20	16,817 97
October	139 00	15,957 55	783 35	285 68	140 15	17 00	44 15	17,366 88
November	161 90	15,135 95	621 20	253 70	150 00	10 90	86 90	16,420 55
December	169 90	15,447 30	610 15	252 15	174 90	9 00	57 50	16,720 90
1914.								
January	142 90	17,655 88	664 25	315 35	185 65	20 50	20 85	19,005 38
February	144 00	16,336 37	721 95	338 72	129 90	25 25	13 40	17,709 59
March	172 00	18,510 82	752 45	345 00	235 00	22 00	29 16	20,066 43
	1,844 60	199,069 34	7,866 50	3,593 67	1,949 25	212 14	466 21	215,001 71

The total number of patents granted to Canadian investors was 1,334, and were distributed among the provinces of the Dominion as follows:—

Ontario.	Quebec.	British Columbia.	Manitoba.	Alberta.	Saskatchewan.	New Brunswick.	Nova Scotia.	Prince Edward Island.	Yukon.
607	278	157	115	46	59	30	39	2	1

Patents issued to residents of Canada, with the ratio of population to each patent granted:—

Provinces.	Patents.	One to Every
British Columbia	157	2,500
Manitoba	115	3,962
Ontario	607	4,157
Quebec	278	7,206
Alberta	46	8,145
Saskatchewan	59	8,346
Yukon	1	8,512
New Brunswick	30	11,729
Nova Scotia	39	12,624
Prince Edward Island	2	46,864

NATIONALITY OF FOREIGN INVENTORS.

Countries.	1909.	1910.	1911.	1912.	1913.	1914.
United States of America	4,602	5,021	4,885	4,997	4,964	5,220
Great Britain and Ireland	346	392	359	506	495	558
Germany	215	241	304	336	307	300
Australia	58	60	77	99	75	76
France	59	75	97	108	100	115
New Zealand	36	37	33	46	47	50
Sweden	40	39	54	52	64	40
Belgium	17	20	25	20	23	33
Austria	33	23	20	24	40	35
Italy	10	8	12	6	16	14
Switzerland	11	12	26	23	20	22
Denmark	8	8	5	14	15	16
Transvaal	12	12	16	10	7	1
Hungary	5	7	6	6	6	5
Russia	4	14	18	6	17	13
Norway	9	18	20	17	10	32
Newfoundland	1	2	3	1	2	1
Netherlands	4	0	0	.....	.....	7
Mexico	4	11	7	10	8	7
Cape Province	1	0	3	4	4	1
Cuba	0	1	5	1	1	9
Spain	2	1	3	.....	.....	1
Chile	1	0	1	.....	1	0
Finland	1	0	1	.....	1	0
Portugal	1	0	0	.....	.....	0
Roumania	1	0	1	1	.....	0
Grand Duchy of Luxemburg	1	0	0	.....	.....	0
Algeria	0	0	1	.....	.....	0
Japan	1	2	0	2	2	1
India	0	0	5	3	1	7
Natal	0	0	0	1	2	0
Nicaragua	0	0	1	.....	.....	0
Brazil	0	0	2	1	.....	1
Turkey	0	0	0	.....	.....	0
Poland	3	2	0	.....	.....	0
Holland	0	2	11	8	7	8
Argentine Republic	4	5	1	1	.....	2
Panama (Canal Zone)	2	0	0	3	.....	3
Egypt	.....	1	1	.....	.....	1
Southern Rhodesia	.....	1	.....	.....	.....	0
Peru	.....	.....	.....	3	2	0
Hawaii	.....	.....	.....	3	3	0
Venezuela	.....	.....	.....	2	1	1
Trinidad	.....	.....	.....	1	.....	0
Porto Rico	.....	.....	.....	1	2	0
Tunis	.....	.....	.....	.....	1	0
Ceylon	.....	.....	.....	.....	1	0
Straits Settlements	.....	.....	.....	.....	1	0
Philippine Islands	.....	.....	.....	.....	.....	1
Canary Islands	.....	.....	.....	.....	.....	1
Java	.....	.....	.....	.....	.....	1
Channel Islands	.....	.....	.....	.....	.....	1

Statement of the number of patents issued under the Act, on which the fees are paid for periods of six, twelve or eighteen years, at the option of the patentee; and of patents on which the certificates of payments of fees were attached after the issue of patents originally granted for periods of six and twelve years:—

Period for which Fees were paid on First Issue.			Patents on which Certificates were attached after issue.		Reissues.		
6 years.	12 years.	18 years.	6 years.	12 years.	6 years.	12 years.	18 years.
7,867	4	26	1,230	93	19	1	1

COMPARATIVE STATEMENT of the transactions of the Patent Office from 1872, when foreign applications were first admitted, to 1914, inclusive.

Year.	Applications for Patents.	Patents and Certificates Granted.			Caveats.	Assignments of Patents.	Fees received.
		Patents.	Certificates.	Total.			
							$ cts.
1872	752	671		671	184	327	18,651 65
1873	1,124	1,016	10	1,026	171	547	28,889 64
1874	1,376	1,218	27	1,245	200	711	32,962 48
1875	1,418	1,266	57	1,323	194	791	33,380 82
1876	1,548	1,337	46	1,383	185	761	34,429 38
1877	1,445	1,277	75	1,352	168	841	33,656 30
1878	1,428	1,172	96	1,268	172	832	31,992 42
1879	1,358	1,137	101	1,238	203	728	30,868 88
1880	1,601	1,252	156	1,408	227	855	38,334 99
1881	1,956	1,510	222	1,732	226	907	48,083 95
1882	2,266	1,846	291	2,137	198	955	55,854 79
1883	2,641	2,178	291	2,469	242	1,052	67,625 48
1884	2,681	2,456	167	2,623	238	1,772	63,257 47
1885	2,518	2,233	214	2,447	222	1,075	62,176 23
1886	2,776	2,610	250	2,860	187	1,322	67,176 23
1887	2,874	2,596	254	2,850	219	1,335	67,940 21
1888	2,747	2,257	282	2,539	240	1,159	65,246 51
1889	3,279	2,725	356	3,081	221	1,437	78,046 72
1890	3,560	2,428	369	2,797	248	6,207	84,150 78
1891	3,233	2,343	393	2,736	215	1,231	77,723 63
1892	3,176	3,417	415	3,832	242	1,500	77,216 76
1893 (only 10 months)	2,614	3,153	292	3,445	229	1,345	63,850 19
1894	3,291	2,756	412	3,218	301	1,445	80,682 56
1895	3,387	3,074	422	3,496	343	1,550	86,358 48
1896	3,728	3,488	413	3,901	306	1,420	93,532 52
1897	4,300	4,013	284	4,297	377	1,551	102,117 92
1898	4,200	3,611	262	3,873	363	1,657	99,361 95
1899	3,305	3,151	412	3,563	311	1,467	107,261 56
1900	4,628	4,522	482	5,004	283	1,914	113,852 46
1901	4,817	4,766	551	5,317	302	2,323	120,064 37
1902	5,301	4,391	510	4,901	317	2,339	129,896 82
1903	5,912	5,673	432	6,105	328	2,384	141,363 81
1904	6,061	6,091	517	6,607	303	2,472	145,896 10
1905	6,355	6,111	536	6,647	300	2,576	152,085 45
1906 (only 6 months)	2,857	2,378	271	2,649	137	1,232	69,700 46
1907	7,077	6,121	634	6,755	285	3,003	169,548 78
1908	7,406	6,774	744	7,518	317	2,900	178,482 49
1909	7,239	6,395	827	7,222	319	3,001	176,692 05
1910	7,789	7,223	1,010	8,233	448	3,147	194,571 54
1911	8,037	7,249	1,002	8,251	406	3,356	200,164 41
1912	8,293	7,399	1,113	8,512	348	3,725	207,762 77
1913	8,681	7,502	1,199	8,701	353	3,741	218,125 02
1914	8,359	7,918	1,323	9,241	354	3,432	215,001 71

The total number of reports issued by the examiners during the year was 12,742, an increase of 1,191, and 21 patents were surrendered and reissued.

Out of the total number of patents granted by this office during the year there were 5,220 issued to inventors or assignees resident in the United States, being 66 per cent of the whole issue.

This branch of my department continues to receive the official reports of patents from Great Britain, Australia, New Zealand, United States, Mexico, Portugal, Italy, Belgium, France and Japan, in addition to other periodicals of a scientific nature, in exchange for the Canadian Patent Office Record.

There were 2,142 patents brought under the conditions of the compulsory license clause, section 44 of the Patent Act, an increase of 235 over the preceding year.

The number of notices under section 8 of the Patent Act was 923.

IV.—COPYRIGHTS, TRADE MARKS, INDUSTRIAL DESIGNS AND TIMBER MARKS.

STATEMENT of fees received by the Copyright and Trade Mark Branch from April 1, 1913, to March 31, 1914.

Months.	Trade Marks.	Copyrights.	Designs.	Timber Marks.	Assign-ments.	Copies.	Total.
1913.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
April	3,599 40	155 00	95 00	2 00	41 00	34 25	4,091 15
May	3,946 85	157 90	95 00	.....	64 50	56 75	4,321 00
June	4,004 63	180 00	107 00	16 00	48 00	26 60	4,382 23
July	3,198 00	141 00	75 00	.....	63 00	33 65	3,510 65
August	3,165 12	146 50	70 00	2 00	35 00	59 00	3,477 62
September	4,250 25	194 50	40 00	8 00	27 00	26 85	4,546 60
October	3,964 05	161 50	60 00	6 00	33 90	66 50	4,291 95
November	3,274 95	204 50	86 00	40 00	27 10	12 75	3,645 30
December	3,540 50	155 35	112 50	26 00	54 00	22 50	3,910 85
1914.							
January,	4,205 35	142 47	45 00	42 00	67 00	24 00	4,525 82
February	3,635 15	168 20	75 00	6 00	34 00	61 50	3,979 85
March	4,509 36	203 50	82 00	12 00	41 90	42 40	4,891 16
	45,293 61	2,010 42	942 50	160 00	536 40	466 75	49,574 18
Refunds	8,016 20	53 50	79 50	.....	3 00	5 50	8,157 70
	37,277 41	1,956 92	863 00	160 00	533 40	461 25	41,416 48

The particulars of the registrations made by the Copyright and Trade Mark Branch of the Department of Agriculture during the year ended 31st March, 1914, are as follows:—

I. Copyrights—		
Full Copyrights without Certificates	1,469	
Full Copyrights with Certificates	207	
Temporary Copyrights without Certificates	62	
Temporary Copyrights with Certificates	1	
Interim Copyrights without Certificates	92	
Interim Copyrights with Certificates	4	
Assignments of Copyrights	20	
		1,855
II. Trade Marks		1,378
Renewals of Specific Trade Marks	56	
Assignments of Trade Marks	215	
III. Industrial Designs		165
Renewals	9	
Assignments	23	
IV. Timber Marks		57
Assignments	3	
Total registrations		3,761

The following table shows a comparative statement of the business of this branch from 1903 to 1913, inclusive:—

Year.	Letters Received.	Letters Sent.	Copyrights Registered.	Certificates of Copyrights.	Trade Marks Registered.	Industrial Designs Registered.	Timber Marks Registered.	Assignments Registered.	Fees Received.
1903	2,687	3,211	900	176	557	88	23	272	18,086 25
1904	2,858	3,293	1,106	228	621	107	25	118	20,647 30
1905	3,367	3,902	1,130	189	661	139	22	154	23,706 75
1906	5,340	5,193	1,228	169	1,119	125	47	282	33,107 10
1907	4,475	4,353	1,140	175	848	182	33	136	30,073 20
1908	6,647	4,980	1,416	170	892	162	44	343	37,514 00
1909	6,320	5,750	1,535	171	1,059	143	108	174	38,071 31
1910	6,411	7,688	1,699	206	1,021	118	39	286	42,153 76
1911	7,027	7,091	1,593	213	1,212	149	39	230	46,327 86
1912	9,435	9,322	1,760	205	1,315	128	15	559	51,043 21
1913	8,441	9,220	1,835	207	1,378	165	57	264	49,409 68

V.—PUBLIC HEALTH AND QUARANTINE.

This year has been an exceptionally heavy one. At the coast quarantine stations on the Atlantic and the Pacific no less than 582,687 persons have been inspected, whilst along the international frontier between this country and the United States it has been necessary to place seventeen temporary medical officers to prevent the introduction of disease into Canada.

The large number of 1,964 persons were admitted into hospital at the various stations. In every instance the disease was stamped out at the station, and so prevented from appearing inland.

Considerable improvements have been introduced in the service, and thus each year the country is more effectively protected against the entrance of communicable and other infectious diseases, while at the same time there is a steady reduction of the annoyances to individuals and damage to commerce in which earlier quarantine systems were constantly involved.

And so, by the skilled watchfulness of the officers working night and day upon our coasts and frontier, the people of Canada have been saved again this year from the inroads of epidemic disease from abroad.

Asiatic Cholera.—During the past year this disease has been reported in the following countries: Austria-Hungary, Bulgaria, Ceylon, China, Dutch East Indies (Borneo, Celebes, Java and Sumatra), India, Indo-China, Japan, Philippine Islands, Roumania, Russia, Servia, Siam, Straits Settlements, Turkey-in-Asia, Turkey-in Europe, and Zanzibar.

The greatest threatening of the spread of the disease came as an aftermath of the Balkan war, from the demoralization of armies, the soldiers of which brought the disease back from the front. The interest and intelligent activities of the various Governments concerned resulted in preventing its widespread extension.

Bubonic Plague.—This disease has been reported during the year in the following countries: Australia, Azores, Brazil, British East Africa, Ceylon, Chile, China, Cuba, Dutch East Indies, Ecuador, Egypt, India, Indo-China, Japan, Mauritius, Morocco, New Caledonia, Peru, Philippine Islands, Russia, Siam, Tripoli, Turkey-in-Asia, United States of America, and Zanzibar.

Two fatal cases of this disease occurred this year in the state of California, apparently contracted from plague-infected ground squirrels.

In Seattle, Wash., eighteen plague-infected rats have been found since September 30 last, the last two in the early part of this month. In consequence of this the Department of Marine was asked, in accordance with an agreement with them, to instruct all harbour-masters in British Columbia to enforce the breasting-out, etc., of vessels from Seattle as provided for in the special regulations governing such conditions, as detailed in my last annual report.

In Havana three cases of plague were reported on the 25th instant.

In Japan the last report received from Hong Kong under date the 14th instant gives 38 cases in Hong Kong, with 27 deaths. Cases are also reported from Kobe and Yokohama.

Smallpox.—This disease has again had an almost world-wide appearance during the year.

Cases of it were reported by incoming vessels at the quarantine stations at Grosse Isle, Que.; Halifax, N.S., three vessels; William Head, B.C., Sydney, N.S., and Louisburg, N.S., one vessel each. In all cases the disease was stamped out at the stations.

Epidemic outbreaks of this disease in the states of Washington, North Dakota, Minnesota, Michigan and New York led to the appointment of temporary medical quarantine officers to carry out international inspections on the frontier between this country and the United States as follows: In British Columbia, two medical officers and five guards; Manitoba, eight medical officers with one guard; Ontario, seven medical officers and ten guards.

This international quarantine on the southern frontier of British Columbia, of Manitoba, and at Niagara Falls has since been raised. I have still to keep it in force, however, on the Rainy river, at Fort Francis, Rainy River, and Emo; and at Sault Ste. Marie.

In compliance with the representations of the shipping interests, and to bring our regulations into conformity with what is the universally accepted period of incubation of smallpox, and accepted at the quarantine of other countries, they were modified by Order in Council on the 13th December last so as to fix fourteen days as the recognized period of incubation of, and observation for, smallpox.

Leprosy.—There are at present in the leper lazaretto at Tracadie, N.B., nineteen patients, ten males and nine females. Of these, fifteen are of French-Canadian origin, two of English, one of Icelandic, and one of Russian. There have been four deaths and two admissions during the year.

The two former inmates discharged apparently cured in 1912 remain in good health. Whether they may fairly be claimed as cures, under the treatment carried out, or whether they are instances of limitation of, or the production of auto-immunity against this disease, it will require more experience to determine.

At the leper lazaretto at Darcy Island, B.C., there is now a Chinese leper, admitted on the 19th instant.

Beri-beri.—Further observations have been made, and articles published during the year as to the etiology of this disease; and arguments have been stated for and against its causation by polished rice.

The consensus of opinion seems to be that, whilst a diet of rice deprived of its pericarp will produce neuritis, it by no means follows that there may not be still other types of endemic tropical neuritis, the causes of which remain undetermined.

Enteric Fever.—Anti-typhoid inoculations have increased in recognition and in favour during this year. Many articles have been published and addresses given urging its general adoption. During this present month several addresses upon this subject have been delivered in this country by Sir William B. Leishman, K.C.M.G., F.R.S., Professor of Pathology, Royal Army Medical College, London.

He was one of a committee of experts whose function was to get information in regard to all that was known of the subject, and to conduct further research with a view to the improvement of the vaccine. This committee has now presented its final report. It recommends the universal adoption of typhoid vaccination in the Brtiish army.

Typhus Fever.—This disease has shown itself this winter at United States ports more than of late years. It has occurred chiefly amongst immigrants from southern Europe. It has been present in a light form in New York and other large cities, under the name of Brill's disease.

Tuberculosis.—I referred in my last annual report to the claims of Dr. Friedman, of Berlin, that he had discovered a turtle serum vaccine for the prevention and cure of this disease. The Canadian Association for the Prevention of Tuberculosis appointed a committee to study and report upon the cases treated in Montreal, Ottawa, Toronto and London. That committee has reported that the results have been disappointing, the claims made for the remedy have not been proved, and that nothing has been found to justify any confidence in the remedy.

Circulars.—Circular letters were issued from time to time to the different officers, calling their attention to the various matters during the year connected with the appearances of epidemic diseases abroad.

New Organized Quarantine Station.—In October last I advanced the unorganized maritime quarantine station of Summerside, P.E.I., to the position of a full regular station, similar to Charlottetown, P.E.I., for the inspection, etc., of incoming vessels. Dr. A. A. McLellan was appointed as quarantine officer in charge. Prince Edward Island has the right of Federal quarantine protection against disease from her sister provinces of the Dominion, as well as from abroad.

Additional Inspectors on Mail Steamers.—To meet the change from one mail steamer a week to three each week coming up the St. Lawrence, last spring Drs. Bouillon and Lord were appointed in addition to the former officer, Dr. Lepage, to meet incoming mail steamers at Rimouski, Que.

Thus one of the medical officers comes up the St. Lawrence on each of the tri-weekly mail boats, making a detailed inspection between Rimouski and the Grosse Isle station.

Changes in Staff.—Last summer the death occurred of Dr. Watt, medical superintendent of the station at William Head, B.C., and Dr. Hunter, assistant medical officer and bacteriologist, resigned. Dr. Rundle Nelson has been appointed medical superintendent. A bacteriologist to replace Dr. Hunter has not as yet been appointed. Dr. Watt was an experienced and valuable officer. His death caused a loss to the service.

Public Works Health Act.—The inspector for Eastern Canada, Mr. C. A. L. Fisher, reports that amongst the men employed on the various works of railway, tunnel and canal construction, coming under his inspection, he found an almost complete absence of infectious disease throughout the year. He found the medical

service given to be complete, the sanitary condition of the camps good, the hospital accommodation excellent, and the sleeping quarters and boarding of the men to be fully equal to the very good conditions reported previously.

During the year there was an average of 13,220 men employed, with thirty-seven qualified medical officers in charge.

Dr. Clendenan, the inspector for Western Canada railway construction and irrigation work, reports that the epidemic diseases were much less than in previous years. The average number of men employed was 24,465.

Panama Canal.—The completion of the Panama canal will be a triumph of medical even more markedly than engineering skill. From a district that only nine years ago was considered almost uninhabitable, yellow fever has been entirely banished. There has not been a single case since May, 1906.

The triumph is not simply the making possible the construction of the Panama canal, but the demonstration that tropical regions which have been considered hotbeds of infection can be made habitable through the resources of ever-advancing sanitary science.

The whole respectfully submitted.

MARTIN BURRELL,
Minister of Agriculture.

PUBLIC HEALTH

APPENDIX No. 1.

REPORT OF THE DIRECTOR-GENERAL OF PUBLIC HEALTH.

(F. Montizambert, I.S.O., M.D.Edin., F.R.C.S.E., D.C.L.)

March 31, 1914.

Sir,—I have the honour to submit this my report as Director-General of Public Health for the year ending this day.

Asiatic cholera.—Since my last annual report this disease has been reported in the following countries: Austria-Hungary, Bulgaria, Ceylon, China, Dutch East Indies (Borneo, Celebes, Java and Sumatra), India, Indo-China, Japan, Philippine Islands, Roumania, Russia, Servia, Siam, Straits Settlements, Turkey-in-Asia, Turkey-in-Europe, and Zanzibar.

The spread of the disease in southern Europe has apparently been due largely to the demobilization of armies, the soldiers of which brought the disease back from the front.

The news that cholera had spread beyond the borders of the Balkans and had appeared in Hungary confirmed the long-standing fears of sanitarians. When the disease first appeared in Sofia, bacteriologists were hurried from Weichselbaum's laboratory, and 120 cases were fully examined bacteriologically. To the heroic and admirable efforts of Kraus and his associates may be attributed much of the credit for the control of the disease among the Balkan troops. Laboratories were established, pure water supplies provided, suspicious cases examined bacteriologically, and vaccination widely practised. The measures in force sufficed to prevent the wide spread of the disease, and stringent regulations were enforced to stamp out the threatened Hungarian epidemic. Germany and other European nations took precautions looking toward the prevention of invasion of their territory by the disease. The recent existence of the disease in Tunis, Constantinople, India and the Far East and China and other parts of the tropics and sub-tropics, to say nothing of its threatened and even actual entrance into Europe and the United States, rendered the fear of cholera epidemic no idle one. The interest and intelligent activity of the various Governments concerned resulted in keeping the temperate world from the clutches of the disease.

The Tropical Diseases Bulletin for July 15 reviews an article by Salimbeni and Orticoni on the treatment of healthy carriers of the cholera vibrio by enemas of specific serum. While the experiments quoted are not sufficiently extensive to show definite results, they may be suggestive to those who are experimenting on methods of treating typhoid carriers. The review follows:

> "During an epidemic at Marseilles in 1911, thirty-four persons in one asylum were found to be carrying the vibrios without showing any definite symptoms of cholera, although some had slight choleraic diarrhœa. All these were treated as follows: Each received an evacuating enema, and from the

fæces so obtained cultures were made. Immediately after this an enema of 50 cubic centimeters of cholera serum in 200 cubic centimeters of salt solution was slowly injected, attempt being made to let the injection penetrate as far into the intestine as possible. In nine out of the thirty-four the vibrios had disappeared at the time of the first injection; in twenty-two of the remainder they disappeared within two days, and in the three others in three to six days after the injection. None developed cholera. The numbers are small, but in another hospital several carriers continued to excrete the organisms for fifteen days, and at least two developed cholera and died; and the authors consider that the treatment is worth a further trial. In none of their cases could they detect the presence of cholera antibodies in the serum of the patients treated."

From September 5 to 8, 1913, seven cases of cholera were notified on the steamship Canada Maru, which arrived at Kobe, August 31. Two cases of cholera had been removed from the vessel at Nagasaki previous to her arrival at Kobe. On August 9, two cholera carriers were found among employees of the vessel who had been removed to detention quarters at Wada Point. This vessel arrived at the William Head quarantine station on October 3. She had been held eleven days at Kobe, fumigated, her passengers and crew bathed, their effects disinfected, and a new crew signed on. She was all well on arrival at William Head.

Bubonic plague.—This disease has been reported during the year in the following countries: Australia, Azores, Brazil, British East Africa, Ceylon, Chile, China, Cuba, Dutch East Indies, Ecuador, Egypt, India, Indo-China, Japan, Mauritius, Morocco, New Caledonia, Peru, Philippine Islands, Russia, Siam, Tripoli, Turkey-in-Asia, United States of America and Zanzibar.

Writing on the relation between traffic and the spread of plague, W. C. Rucker, assistant surgeon general, United States Public Health Service, states as follows:

"With the dawn of reason came traffic, and man as the only animal that sells and barters has been obliged to erect special barriers to prevent his vegetable and animal foes from attacking him through the avenue of commercial intercourse. Disease, which, after all, is but an outward and visible presentment of this never-ceasing battle, has always been recognized as the constant companion of commerce, and of no disease in particular is this more true than of plague. Who can doubt that at some remote age plague was confined to some small valley, from which it has been carried to all parts of the globe by the roads of trade 'which lead you o'er the world?' What galley seeking Cornish tin brought the first plague rat to England, just as the Ark of the Covenant carried the disease to the Philistines?

"The relation of traffic to the spread of bubonic plague is a simple equation, the one being to the other directly as the opportunity which traffic affords for the spread of rats from plague foci. It may therefore be taken as axiomatic that if we would prevent traffic from spreading plague we must concentrate our efforts on the prevention of the migration of rodents in traffic. If we successfully control the peregrinations of the murinæ we will control the spread of plague, because for all practical purposes man may be disregarded as a great factor in the grand tactics of plague. It is true that human pneumonic plague has been held responsible for certain outbreaks, and it is also a fact that verminous persons suffering from the septicemic form of the disease have acted as infection nidi, but these are local matters only and bear no vital relation to the world-spread of plague. Plague usually passes from rats to man, not from man to rats.

"It were better that the sanitary authorities had constant and accurate information as to the existence of rodent plague in the various ports, but unfortunately such knowledge is not always obtainable, or is perhaps obtained too late to prevent an exodus of the disease from a previously unrecognized focus of rodent plague. The measure then is obvious—let there be a world-wide embargo on rats. Let no rat take passage on any ship whatsoever, and if at the port of destination any rat is found on board, the penalty which he shall suffer is death. Every ship-borne rat must be regarded as a potential enemy not only to the life but also to the prosperity of man. Emphasis may be laid on the ship-borne rat because the overland spread of plague is not of material influence on the end result. Plague does not follow the caravan routes by reason of the transportation of rats; in fact, it is more than probable that verminous persons act as disseminating agents in such a situation; the carriage of infected rodents by freight trains undoubtedly does occasionally occur, but these are matters of minor consideration in the universal spread of plague in which the chief agent is the ship-borne rat.

"We have laid too much stress in the past on the human passenger, and we have paid too little attention to the rodent passenger. It is futile to examine and detain persons who have been exposed to plague infection and to neglect rodents which actually have the disease. It is equally absurd to quarantine against passengers from infected ports and to permit the landing of rats from ports which are considered safe merely because plague has not been reported from them. There is only one policy which we can logically pursue; that is to regard all ship-borne rats as elements of danger and to prevent their entering or leaving ships, and to confine our operations against passengers to the prevention of embarkation by persons actually suffering from the disease or in a verminous condition. It is time that there was a revision of the regulations of the International Sanitary Convention of Paris to meet the present-day interpretation of the method of the dissemination of bubonic plague. It is the plague rat which we must prevent from taking passage, and we should not confine our attention to the human passenger.

"The first element in preventing rats from entering ships is a rat-proof water front. This is not only a matter of importance in relation to the spread of plague by traffic; it is also an insurance against the fire and destruction losses which rodents cause. Rat-free vessels need not be obliged to breast-off from rat-proof, rat-free wharves. This facilitates the handling of cargo, because vessels may then discharge at the dock on one side and to lighters on the other.

"It is equally necessary that vessels be prevented by other means from receiving rats while tied up to the wharf and from discharging them under similar conditions. For this purpose the use of proper rat guards on mooring lines is to be recommended, care being taken that the guards are always perpendicular to the line, and that they are of sufficient diameter to prevent rats from leaping over them. It is entirely practical to construct a wharf and vessel in such a way that rats will be captured almost as soon as they get on them. For this purpose, when the dock is built, or the ship is laid down, suitable runways, which will entice the rats, should be installed. By means of swing doors, which operate from a platform, it is very easy to capture all the rats on board of a ship, or on a dock, in this way. The rats are imprisoned in the runways and can at any convenient time be driven by smoke or other means into a common chamber, the doors of which can be shut, and the rodents asphyxiated.

"It is not, however, practicable at the present time to secure an immediate world-wide adoption of the measures above referred to. This is a matter for the coming years, one demanding and deserving our careful and continuous labours. In the meantime, the periodic fumigation of ships for the purpose of killing the rats thereon is a most desirable measure."

We must inculcate the lesson that the rat is the most expensive animal which man maintains, and that the limitation of this species, its isolation from the dwelling place of man, and the control of its migrations are as important from an economic as from a humanitarian standpoint.

California.—A fatal case of bubonic plague occurred in Contra Costa county, Cal., and one in San Benito county. A death from bubonic plague occurred at Martinez, Cal., according to reports received by the state board of health from Dr. J. D. Long of the United States Marine Hospital Service in San Francisco. At the same time a message was received by the board from its secretary, Dr. W. F. Snow, now in Washington, D.C., stating that the Federal Government had decided to appropriate $40,000 additional to fight the disease.

The body of the Martinez victim, whose name had been withheld, was examined by Dr. D. H. Curry, of the federal laboratory service in San Francisco. Dr. Long personally passed upon the examination before pronouncing the case one of plague.

A Japanese woman in San Benito county, it was said at the health office, died of bubonic plague, in June of this year. These two cases are the only ones reported in many months.

"Ever since bubonic plague first gained a foothold on this continent, it has continued prevalent among rats and ground squirrels. The labourer at Martinez and the Japanese strawberry picker in San Benito were working in neighbourhoods known to be infested with diseased squirrels. No doubt they became infected themselves from working in ground infected by squirrels.

Seattle, Wash., Oct. 9.—A bubonic plague-infected rat was killed on the water front here several days ago, the first in years, and the health department immediately spread poison in the neighbourhood and took other steps to exterminate rats. For many years Seattle has paid a bounty of ten cents on each dead rat brought to the health department, and has employed rat catchers besides. The danger of plague is always present, because rats jump overboard from Oriental boats and swim ashore, sametimes a mile.

Dr. James E. Crichton, health officer of Seattle, said that the bubonic plague rat situation in Seattle was serious, but that the health department hoped to prevent an outbreak of the disease.

"Not for six years," he said, "has there been a case of bubonic plague in a human being in Seattle. In those six years we have found twenty-four plague rats. A considerable number were taken during the plague outbreak six years ago, and recently seven were killed in a section of the water front which has been thoroughly isolated. Thousands of dollars are being expended in Seattle under the orders of the health department in tearing down condemned wooden buildings, constructing cement basements, and otherwise making the water front as rat-proof as possible. The infected district is two blocks long and one block deep, and fronts on the bay with a planked street behind. We are trying to make it impossible for rats to lodge or breed on the waterfront."

Between September 30 and October 28, nine plague-infected rats were found. Others were found on November 5, December 9 and 13, January 1, 12, 16 and 19, and March 1 and 7. A total since 30th September last of eighteen.

Upon the first reports of these conditions, Dr. Nelson, quarantine officer at William Head, B.C., was directed to proceed to Seattle to study and report upon the situation, and the Department of Marine was asked, in accordance with our agreement with them, to instruct all harbour masters in British Columbia to enforce the breasting-out, etc., of vessels from Seattle, as provided for in the special regulations governing such conditions.

A woman died in Seattle on December 27 of an acute illness. An autopsy was performed and the findings were passed upon by a board of four physicians, one of whom was an officer of the United States Public Health Service, and one the chief medical inspector of the local health department. Previous to the autopsy the body had been embalmed, so that it was impossible to make cultures and ascertain definitely the nature of the disease. This board reported that the anatomical diagnosis was:

> "An acute infection, presenting in the spleen and in the cavity of the brain, micro-organisms morphologically identical with bacillus pestis, associated with Gramstaining diplococci, not of a specific character.
>
> "On account of the thoroughness of the embalming process, it was impossible to obtain cultures of these organisms.
>
> "Conclusions: Probable diagnosis, septicemic plague. Absolute diagnosis impossible."

The report was made and signed by Dr. Charles B. Ford, Dr. F. S. Bourns, Surg. B. J. Lloyd, United States Public Health Service, and Dr. C. F. Davidson, chief medical inspector.

The *British Medical Journal* of January, 1814, gives the following conclusions furnished by Drs. Castellani and Philip upon the recent outbreak of plague in Ceylon:

> "1. For the first time in the history of Ceylon plague has broken out in the island, shattering the old general belief held by the public that this disease would never appear in the country.
>
> "2. The type of the disease has been septicemic in all cases observed by us except in two recent ones in which axillary buboes were present. They all died within twenty-four to forty-eight hours from the onset. No cases of the pneumonic type have so far been observed.
>
> "3. The disease has probably been imported from some Southern Indian port, but we have been unable to trace it with certainty, and it is noteworthy that no steamers or boats with suspected cases have arrived in Colombo for more than a year. Another hypothesis is that there may be an unrecognized focus of plague in Ceylon.
>
> "4. An interesting feature of the outbreak has been the absence—to all appearances at least—of a discovered epizootic among the rats preceding the human epidemic. This suggests that infection took place first among men, and that rats have become infected later.
>
> "5. The infected rats so far examined have not shown any buboes, though the heart blood was teeming with plague bacilli. The plague among rats therefore appears to have been of the same type as that among men. It is probable that as soon as the Ceylon strain loses some of its virulence the bubonic type will appear both in rats and man. In man, as stated, we have already found two cases of the latter type .

London.—Rats are being regularly trapped and poisoned in the vicinity of the principal docks in London. Rats caught are also being examined bacteriologically.

During the year 1911, 1,250 rats were examined and one was found infected with plague. During the year 1912, 1,310 rats were examined and thirteen found plague-infected. It is reported that only two infected rats have been found this year, the last having been trapped on or about November 12, 1913. During the past six years infected rats have been found each year among those trapped along the London docks.

Cuba.—Public Health Reports of the 20th instant says:

"Between March 5 and March 9 two cases of human plague were reported in Habana, Cuba. The time was when such an announcement would have caused consternation to shipping interests and would have been a source of much worry to United States seaports.

"There is very little, if any, reason for fear under the circumstances. The manner in which plague spreads is known. It is known that ordinarily plague spreads only through the medium of rats, and that usually wherever a human case occurs there has previously been plague in rodents. This knowledge has caused epidemiologists to pay really more attention to the existence of plague in rats than to its presence in man. It has caused them wherever cases in man occur to trap rats diligently in the localities of the human cases and usually within a considerable radius of such localities. These rats are trapped mainly for the purpose of laboratory examination, so that the existence and extent of the disease in rodents may be ascertained. The control of the disease is then largely a question of its eradication among rodents or of the rat-proofing of human habitations to such an extent that the sick rats and their infectious fleas can not gain access to man.

"The disease can be effectively controlled where intelligent sanitary measures are employed. But fully as important as intelligent sanitary measures, and perhaps even more important, both in the prevention of the spread of the disease and in preventing undue interference with shipping and unwarranted fears in commercially related ports and countries, is sanitary honesty.

"By this is meant giving frankly to those who may be interested or affected by the existence of a disease in a port prompt and full information regarding existing conditions. So far as plague is concerned, and the same is true of most other diseases, there is little to be feared when conditions are known. It is only in the absence of definite and dependable information, when people do not know existing conditions and consequently allow their imaginations full play, that the occurrence of a few cases of such a disease as plague gives anything but nominal inconvenience to social and commercial intercourse."

On March 25, three new cases of plague were reported at Havana. The persons attacked were Spaniards employed as clerks by a sugar firm. One death was reported on the 26th instant.

Japan.—The last report received from Hong Kong, under date 14th March, gives for the week ending that day a total of thirty-eight cases in Hong Kong, with twenty-nine deaths. Cases are also reported from Kobe and Yokohama.

Philippine Islands.—Eighteen cases of human plague, with fourteen deaths, are reported since November 10 on these islands. No plague rats have been found since September.

Smallpox.—This disease has again had an almost world-wide appearance during the year. Cases of it were reported by incoming vessels at your Quarantine stations,

Grosse Isle, Que. (five vessels), William Head, B.C. (one vessel), Halifax (three vessels), Louisburg and Sydney, N.S. (one vessel). In all cases the disease was stamped out at the quarantine station.

Epidemic outbreaks of this disease in the states of Washington, North Dakota, Minnesota, Michigan, and New York led to your appointment of temporary medical quarantine officers to carry out inspections on the international frontier as follows: In British Columbia, two medical officers with five guards; Manitoba, eight medical officers, with one guard; Ontario, seven medical officers, with ten guards. The international quarantine on the southern frontier of British Columbia, of Manitoba and at Niagara Falls has since been raised. It is still in force on the Rainy river, at Fort Frances, Rainy River, and Emo, and at Sault Ste. Marie.

In compliance with the representations of the shipping interests, and to bring our regulations into conformity with what is the universally accepted period of incubation of smallpox, accepted by all other countries, they were modified by Order in Council on the 13th December last so as to fix fourteen days as the recognized period of incubation for smallpox.

In an article published in December last in *Public Health,* the journal of the Society of Medical Officers of Health, Dr. W. McWanklyn, Assistant Medical Officer of Health, London County Council, on "Vaccination: Its increasing neglect in recent legislation," he gives the following chronological table of English vaccination legislation:

"1840. 3 and 4 Vict., c. 29. Vaccination first dealt with by legislation. The Act provided means at the public cost, but left the operation optional. Repealed by the Act of 1867.

"1841. 4 and 5 Vict., c. 32 amended the Act of 1840. Repealed by the Act of 1867.

"1853. 16 and 17 Vict., c. 100. Vaccination first made compulsory. The duty was assigned to the Poor Law Guardians. A penalty was imposed on defaulting parents. Repealed by the Act of 1867.

"1858. 21 and 22 Vict., c. 97. This Act transferred the powers of the General Board of Health, which expired in this year, to the Privy Council, and the Council was empowered to issue regulations regarding vaccination. (This power was repealed by the Act of 1867.) It was also authorized to appoint a medical officer. This Act had effect for one year only.

"1859. 22 and 23 Vict., c. 3. Made the Act of 1858 perpetual, with the exception of section 8, in reference to the institution of legal proceedings.

"1861. 24 and 25 Vict., c. 59. To facilitate proceedings before Justices. Repealed by the Act of 1867.

"1866. A Bill was introduced to consolidate and amend the statutes relating to vaccination in England. It was withdrawn.

"1867. 30 and 31 Vict., c. 84. This Act consolidated the previous Acts and enlarged their scope. It also required guardians to form vaccination districts and contract with medical practitioners to perform vaccination. This Act forms the basis of the system in force at the present time. It is the principal Act.

"1871. The Act of this year was the outcome of the findings of a Select Committee on the working of the Act of 1867. Among other things it empowered the Local Government Board to make regulations and required guardians to appoint vaccination officers; they were permissive under the Act of 1867.

"1874. Order of Local Government Board regulating the appointment of vaccination officers and of proceedings for enforcing the provisions of the Acts.

"1889. Royal Commission appointed to examine into the working of the Vaccination Acts, brought about mainly by the opponents of compulsory vaccination. Sat for seven years.

"1898. An Act based on the findings of the Royal Commission of 1889. Enabled a parent or guardian on satisfying a magistrate of 'conscientious objection' to vaccination to suffer no penalty for not having a child vaccinated. Amended by Act of 1907.

"1907. An Act enabling conscientious objectors to vaccination to obtain exemption by sworn declaration in lieu of having to satisfy a magistrate of the sincerity of their convictions."

The following is from the journal of the American Medical Association, under date of February 28, 1914:

> "It is an undeniable fact that many persons have been led to expect disagreeable symptoms from vaccination because of the sequels, which at times in the past have made this procedure annoying to the subject. To-day it ought to be frankly admitted that for the most part these objectionable features are undoubtedly the result rather of the vaccination than of the vaccinia. Isadore Dyer, of the Tulane University College of Medicine in New Orleans, has strongly urged the modification of certain common practices in connection with vaccination in the belief that they not only represent an unnecessary hardship and discomfort, but also contravene the best hygienic postulates in developing immunity to smallpox by producing vaccinia in the subject. Many operators leave the 'after-treatment' of vaccination to the person concerned, indifferent as to the vesicles, the pustulation and the pit or pock-mark deemed the evidence of a successful vaccination. Dyer points out that when the vesicle forms at the site of inoculation the person inoculated with the virus has vaccinia, just as much as the person with a chancre has syphilis. He insists that the vaccination should stop at the vesicle, and that the pustule—a sign of local infection with pus organisms—should be prevented. In smallpox itself every effort is made to avert the appearance of pustulation and the consequent pitting. Why not in vaccination? If we admit that the vaccination process should stop at the vesicle and that pustulation is not only unnecessary but even undesirable, then the eruption should be checked before the objectionable stage by purposefully breaking the vesicle and treating the site antiseptically. Dyer remarks that the evils of vaccination are prevented by such a procedure; there can be no impetigos, and multiforme erythema and its congeners cannot result from pus absorption. Dyer ventures the contention that it would be better to make sure of the most complete protection against smallpox by making sure of the highest obtainable immunity against vaccinia. Would it not be better, he asks, to vaccinate the subject repeatedly until the vaccine no longer takes? In other words, if a vesicle forms, vaccinate again, at once rather than at the end of seven years, and continue vaccinating as long as a vesicle forms, until the person is completely immunized."

International Frontier Quarantine.—As already briefly alluded to, you have found it necessary to institute this for the protection of this country against smallpox at several places.

In October last this disease developed in epidemic form around Oroville and other places in the state of Washington, near our frontier south of British Columbia.

Accordingly, on October 31, you appointed medical inspecting officers at Grand Forks and at Keremeos and Hedley, with guards to watch and report from trails, etc., at Brideville, Chapaka, Keremeos, Myreaster, and Osoyoos. After the cessation of the outbreak this quarantine was raised finally at the end of February.

South of the Rainy River district in Ontario, an outbreak of smallpox in Minnesota led to your appointing a medical inspecting officer at Emo, on October 17; and as the disease spread on the south of the frontier line, a similar inspector at Rainy River on December 27, and a similar one at Fort Frances on January 23. These three medical officers are still on duty.

At Niagara Falls two medical officers were appointed by you on January 24, and a third on January 30, on account of a widespread outbreak of smallpox in Niagara Falls, N.Y. On account of the many ways of crossing, ten guards were employed under the three medical officers. Owing to the very efficient measures taken by the State Board of Health of New York, this epidemic was so successfully stamped out that you were enabled to raise this international quarantine on the 23rd instant.

In North Dakota, U.S., a serious and extended outbreak of smallpox was reported in December last, notably in the counties of Bottineau, Pierce, Ramsay, Rolette and Stutsman, and in the town of St. John. To meet this threatening danger you appointed medical inspecting officers to put in force international quarantine upon the southern frontier of Manitoba, at Boisevain, Cartwright, Crystal City, Deloraine, Gretna, Killarney, Morden and Waskada, with, in addition, a guard at Cartwright. These appointments were made December 28, 29, and 30. All of these inspections, except one, were raised on February 28, and the final one on the 11th instant.

At Sault Ste. Marie you appointed a medical officer on January 27, to carry out international quarantine inspection, in consequence of a serious outbreak of smallpox in the neighbouring state of Michigan. This inspection is still being enforced.

Leprosy.—There are at present in your lazaretto at Tracadie, N.B., nineteen patients, ten males and nine females. Of these, fifteen are of French-Canadian origin, two of English, one of Icelandic, and one of Russian. There have been four deaths, and two admissions during the year.

The two former inmates discharged, apparently cured, in February and November, 1912, remain in good health. They are in poor circumstances, and have to work hard for their living. Similar cases have been reported by other observers. Two are on record in this lazaretto before any treatment was employed. Whether these last two, discharged in 1912, may be claimed as cures under our present treatment, or whether they are instances of limitation of, or the production of auto-immunity against the disease, it will take more experience to determine.

At your leper lazaretto at Darcy Island, B.C., there is now a Chinese leper, admitted on the 19th instant. He has been fifteen months in the country. The disease first began to show itself three months after he landed. He is now awaiting deportation under the Immigration regulations.

Dr. H. Bayon, Research Bacteriologist (Leprosy), Government of the Union of South Africa, in an address delivered at the Royal Society of Medicine on November 29 last, spoke in part as follows:

> "On considering leprosy from a nosological point of view, we are struck by its long incubation, its slow and chronic course, and the terrible mutilations and disfigurement it is capable of producing without appreciably short-

ening the life of its victims. Its general infectivity, or, more correctly, contagiousness, appears to vary somewhat in different climates, because, though nowadays the disease, estimated by the number of cases, is practically confined to tropical and subtropical countries, still it is a universal disease occurring from north to south all over the inhabited world. In other words, it appears to have spread or persisted under some conditions and died out under others, for we know that it was extremely prevalent in Europe in the Middle Ages.

"It is not possible, from a scientific point of view, to deny that leprosy is contagious, even though we may not quite exactly know in which way the disease is transmitted from one individual to another. Knowledge of its contagiousness is founded on the following substantiated observations:

"1. That it is a disease due to a definite micro-organism.

"2. That in Northern Germany, where the disease had been reintroduced from Russia in modern times, the infection was found to have spread concentrically from the first imported cases.

"3. That the overwhelming majority of cases originate in countries where leprosy is relatively common.

"4. That in the rare cases in which the disease has been contracted in countries where leprosy is not indigenous, such as England, Holland, and Southern Germany, we are able in every case to prove the more or less intimate contact with lepers who in their turn came to these districts after a more or less prolonged stay in a leprosy-ridden country.

"5. That in countries where leprosy is relatively rare the disease is found to be bound to definite foci or families. This has been observed in the Alpes Maritimes, on the Riviera, and in the Valais (Switzerland).

"6. That the countries which have carried out universal segregation have been rewarded by a gradual and constant diminution of the disease.

"7. That where segregation has been abandoned or loosely carried out the scourge has attacked an ever-increasing number of individuals.

"The modern medical eye looks, therefore, upon leprosy as a disease which is definitely contagious, though under proper sanitary conditions to a very slight degree. In situations where hygienic precautions are defective and the contact between the diseased and the healthy is unncessarily immediate—where, for instance, a leper is obliged to sleep in the same bed with other members of the family—and personal cleanliness is apt to be in abeyance, the danger of contagion is certainly present to a varying extent.

"We know that at the present moment about twenty-five to fifty lepers, or perhaps more, are living in England, and yet of these only one has acquired the disease in the United Kingdom. The simple precautions these unfortunates are able to take to keep themselves separated from their families have been sufficient to prevent contagion.

"In India, on the other hand, the last census appears to show an increase of lepers from 100,000 to 110,000 in ten years.

"In Basutoland the principal medical officer counted 300 lepers twenty-five years ago. An official report was made asking the Government to enforce segregation, as otherwise an increase to double that number was to be expected within twenty years. For financial and other reasons this advice was not acted upon. Last year a census showed 800 to 900 lepers in Basutoland, so that the principal medical officer does not appear to have gone far wrong in his prophetical estimate.

"Nearly every imaginable drug has been tried, and a great number are still under experiment in the hope of discovering a cure for leprosy; but we have yet to find a specific and sure method of treatment.

"The present position can, however, be summed up by saying that even the most useful therapeutic agent requires the help of an early diagnosis of the disease and proper hygienic conditions; but that at no moment has the therapeutic outlook been so hopeful as at the present moment.

"In its initial stages, leprosy affects the general well-being and appearance of an individual to such a slight extent that any therapeutic effort which succeeded in arresting the disease in its early stages in a fair proportion of cases would practically amount to a cure.

"Spontaneous remissions of the disease and spontaneous apparent 'cures' occur, however, in a small proportion of lepers, and may last for several years, in some instances as long as fifteen years or more, but afterwards the disease may again become virulent and rapidly carry its victim to the grave. Therefore any drug or method of treatment must stand the test of time, five years or more, and be applied to a sufficient number of patients.

"Without taking into consideration these important initial factors, it is absolutely irresponsible to speak of cure in a disease so chronic, so slow, and intractable as leprosy is known to be.

"A review of all therapeutic attempts, many of them very sketchy and salutatory, would fill a volume by itself. I may, however, be allowed to give the results of the experience at Robben Island, and in South Africa generally. For all advanced nodular stages Chaulmoogra oil, or, better, its refined constituent 'antileprol,' injected intramuscularly in doses of 3 to 5 c.cm. is still the best palliative I know. The injections should be repeated every three days, and the course should last five months or more if the patient can stand it, because at times the injections may become very painful. Chaulmoogra oil and antileprol can also be given internally in small capsules, and for this mode of treatment antileprol is decidedly preferable, as it does not cause the gastric disturbances produced by the unrefined oil. Doses varying between 15 minims and ten times that quantity can be taken daily.

"Having shown that leprosy is but slightly contagious if proper sanitary precautions are taken, and that any form of treatment which can be applied with any hope of success must be made use of in the very early stages of the disease, it may seem inconsequent to follow with the statement that only by a universal system of segregation can it be hoped to cope with the spread of the disease successfully and promptly.

"The Americans in the Philippines succeeded by an energetic segregation of all cases in reducing the new admissions by 90 per cent. In South Africa, where in some districts, owing to financial considerations, only about one-half of the leper population is segregated, the rate of admission has remained constant for the last ten years. The Leprosy Repression Act in the Cape Colony was extremely severe, but owing to its very severity it could not be carried out in its entirety.

"Opponents of segregation consider that it is cruel to separate the lepers from their family and friends. Two facts, however, are overlooked. One is that when an individual develops leprosy in a severe form his friends soon abandon him; and that consideration of the feelings of one may mean the misery of many, because one single leper may give rise to several. In a case observed in Northern Germany one girl directly and indirectly infected twenty-eight people.

"It is only in properly constructed and conducted asylums that lepers can be taken care of satisfactorily and prevented from infecting their surroundings. If in the course of time early cases, and a certain proportion of the more advanced, can be favourably influenced by treatment, or even if the present results stand the test of time, there will be ample reason for trying to get rid of the scourge by universal registration and segregation—measures which ensure also proper treatment and care.

"Leprosy is so far-reaching in its social results, for the individual affected is cut off to such an extent from his fellow beings as to render his earning a livelihood very precarious, that whether we look at the matter from the standpoint of humanity or from that of sound policy, it is seen to be the duty of every Government to prevent its further spread."

I am indebted to Victor G. Heiser, Surgeon United States Public Health Service, chief quarantine officer and director of health for the Philippine Islands, for valuable particulars as to leprosy in the San Lazaro hospital, Manila, contained in one of the reports of his bureau for 1913. This report says:

> "On June 11, there were released from San Lazaro hospital two persons who were formerly afflicted with leprosy, and have now been pronounced free from the disease.
>
> "C. A., male, Filipino, age 27, admitted May 29, 1909. On admission the case presented thickened reddish spots on the nose and thickening and discoloration of the lobe of the right ear. Smears made from the lesions were positive for leprosy bacilli. Beginning August, 1909, he received vaccine treatment at intervals for one year, but apparently there was no change in his condition during this period. From September, 1910, to November, 1910, he took crude Chaulmoogra oil by mouth, beginning with daily fifteen-drop doses, and by November reaching sixty drops per day. The oil was given three times daily in divided doses. From November he received hypodermic injections of the following mixture:
>
> "Chaulmoogra oil .. .. cc... 60
> Camphorated oil .. .. cc... 60
> Resorcin.. .. .. grams... 4
> Mix and dissolve with the aid of heat on a water bath, and then filter.
>
> "The foregoing mixture was given as follows:
>
> "During November .. .. 2 cc. every 3 days.
> During December .. .. 5 cc. every 8 days.
> During January .. .. 10 cc. every 8 days.
>
> "As this large dose was being borne badly it was reduced to 5 cc., which amount was injected every eight days from February to May. There was apparently no change in his condition at the end of the year following the vaccine treatment. During the treatment with crude Chaulmoogra oil by mouth there was some improvement in his condition. This improvement continued during the time that hypodermic injections were given, and on May 6, 1911, all the lesions above described had disappeared and it was impossible to demonstrate the leprosy bacillus. All treatment was then discontinued for a period of one year, during which time he remained negative microscopically. From August, 1912, to June, 1913, 2 cc. were given every ten or thirteen days until the time of discharge.
>
> "The second case was that of G. A., a Filipino women, age 22, admitted to the San Lazaro leper hospital on January 7, 1910. She had a generally

suffused countenance and small red macules on the cheeks, forehead, and chin. Scrapings from these lesions were positive for leprosy bacilli. Vaccine treatment was begun January 15, and continued for a period of five months. At the end of the first month there was apparently no improvement in her condition, and crude Chaulmoogra oil was given by mouth in ascending doses. The initial dose was thirty drops per day, and had reached three hundred drops at the end of four months. At the close of this period there was some apparent improvement, but the oil was no longer borne well, and the Chaulmoogra oil mixture mentioned in the previous case was administered. For the first month 1 cc. was injected into the buttocks every eight days. The next month 10 cc. was injected every four days. Then one dose of 15 cc. was given. After that 5 cc. was injected every six days. By May 6, 1911, there was great improvement in her general appearance, and she was microscopically negative for leprosy. During September, 1911, all treatment was discontinued for one year. Beginning June, 1912, 2 cc. was injected every eight days. Microscopical examinations were made at frequent intervals and always with negative results. On June 11, the date of her discharge, all maculese had disappeared, but there was still some suffusion of the countenance.

"It is not known whether the vaccine treatment had any influence in these cures. It may be said, however, that there are a number of other cases at San Lazaro leper hospital and at the Culion leper colony that have been negative for nearly two years which presented more marked lesions than those already discharged, and yet they received only Chaulmoogra oil, no vaccine being employed.

"Apparent cures have been reported from time to time in the past from San Lazaro hospital, but unfortunately all such cases relapsed or died from some intercurrent disease soon after they were negative for a period of one year. The cases now reported have been negative for a period of two years, and there seems to be ground for hope that the results may be more permanent.

"As soon as the favourable results became generally known among the lepers there was a great demand to take similar treatment, and many hundreds are now taking Chaulmoogra oil in some form or other.

"Owing to the long period over which the oil must be taken and the nauseating effect when given by mouth, experience has shown that few have the hardihood to take the treatment faithfully over a prolonged period.

"Up to the present time the results have not been such as to warrant the belief that a specific for leprosy has been found, but it is thought that if adequate funds were available for the opening of a laboratory for the study of this leprosy treatment and an attached hospital provided which had facilities for making accurate observations, at least a way has been indicated which might eventually lead to success. In order that too great hopes may not be aroused by the present cures, it should be remembered that in the experience of the Bureau one leper has apparently recovered spontaneously—that is, without any treatment being administered—and that for a period of over a year now there have been twenty patients placed under the treatment mentioned above, but only a few of them have shown any signs of improvement."

Under date Manila, October 31, 1913, Surgeon Heiser wrote me as follows:

"It may be of interest to mention that yesterday there was released on probation a girl of fourteen years of age who was admitted to the San Lazaro hospital on January 5, 1911, with the microscopically confirmed diagnosis of leprosy. She took the treatment as described in the Quarterly Report, and has now been negative for leprosy, both clinically and microscopically, for a period of two years. No vaccine or other treatment was given in this case.

"I expect shortly to publish a preliminary report upon fourteen lepers who have taken this treatment since February 21, 1912, under test conditions. Twenty persons afflicted with various types of leprosy were selected. Of these, six refused to take the treatment after a few months' trial, which left fourteen. Of these, one is now negative for leprosy, three are much improved, three are improved, four are perceptibly improved, one died, and two are unimproved.

"In the opinion of the undersigned, nothing has developed up to the present time to warrant the belief that a specific for leprosy has been found. It has been our experience that lepers often improve without any treatment, and we have at least one instance in which a leper recovered completely without treatment."

The February number of the *Journal of State Medicine* speaks of conditions now existing in France as follows:

"Some alarm has been caused by the increase of leprosy in France, and particularly in Paris, and Dr. Marchoux, of the Pasteur Institute, is to report upon measures best fitted to prevent any further spread of the disease."

When I was appointed, twenty years ago, to the supervision of the Tracadie Leper Lazaretto, I introduced the treatment with Chaulmoogra oil and tonics. When *Nastin* was in vogue we gave it a trial, but without very encouraging results, although one patient reported improved under it is still maintaining the improvement, though no injections have been given since November last. We are at present using the compound of Chaulmoogra oil, Camphorated oil, and Resorcin by injections in the gluteal muscles once a week. Steps have been taken for a trial of Antileprol, Dr. Bayer's refined constituent of Chaulmoogra oil, as mentioned in my quotation above from his address.

Beri-beri.—During the year further observations have been made, and articles published as to the etiology of this disease. In the British Medical Journal, 1st November last, Arthur Stanley, M.D., Lond., M.O.H. Shanghai, writes as follows.

"In view of the increased attention to beri-beri and the resuscitation of the 'rice theory' of its origin, founded on what appear to be wrongly interpreted experiments on the feeding of fowls, and especially in view of new legislation recommended on the supposed cause of the disease by consuming decorticated rice, it may be well to record an obvious fact which appears to have been lost sight of by recent workers.

"After a period of close observation extending over fifteen years in Shanghai and other parts of China, beri-beri is found to be common in institutions, such as jails, charitable institutions, and schools, where large numbers of persons live together, but comparatively uncommon among the general population; practically no difference obtaining as regards the food supply, at any rate as regards the kind of rice consumed, which is invariably decorticated by the same process in China. If beri-beri were due to the loss of something in the outer covering of the rice grain, why should the disease show such a marked proclivity towards persons closely aggregated in large numbers? Such are the conditions which make for the spread of infection.

"Isolation of the sick and ordinary disinfection of clothing, etc., have little or no effect on an outbreak of beri-beri, but after disinfestation of body vermin and sulphur fumigation of quarters to kill bugs, etc., there are strong reasons for thinking that prevention of the spread of beri-beri is immediate and effective. This points towards infection by external animal parasites.

"It is interesting to note that practically all new workers on this elusive subject are first attracted by the 'rice theory,' especially in view of other forms of peripheral neuritis, such as ergotism, lathyrism, and perhaps pellagra, being

> attributed to the results of parasitic growths on seeds. This, in fact, appears to represent the first stage of research, which is almost invariably given up when the idea is found untenable as a result of fuller knowledge. But to accept the 'rice theory" as final and to advise Governments to legislate rice with a view to prevention of beri-beri is to discourage further research until, of course, such legislation is found to be futile. Meanwhile, trade may be damaged and the habits of the people unnecessarily interfered with."

The matter is well summed up in a paper read at the tenth annual meeting of the American Society of Tropical Medicine, held at Washington in May last, by Major Weston P. Chamberlain, of the Medical Corps United States Army:

> "It should be stated that all authorities do not accept the polished rice theory of beri-beri production. As a result of clinical and experimental evidence obtained in the Philippines I am personally fully convinced of the correctness of the theory as regards the beri-beri commonly seen in the Orient. In some instances, particularly on ships and in Brazil, a disease called beri-beri is reported as occurring among persons who eat little or no rice. Three explanations of these facts may be offered: Firstly, the dietary may be an unbalanced one, lacking the neuritis-preventing substance, even though it is not a rice diet. Secondly, the neuritis-preventing principle may have been destroyed by excessive heat, as for instance by cooking with steam under pressure. Thirdly, the term beri-beri may include several varieties of neuritis caused by different factors. Neuritis due to poisons, such as lead. arsenic and alcohol, and to toxins produced by bacteria, such as the Klebs-Loeffler bacillus, are well known. That a diet of rice deprived of its pericarp will produce neuritis seems fully established. But it by no means follows that there may not be still other types of endemic tropical neuritis, the causes of which remain undetermined."

Enteric fever.—Anti-typhoid inoculation. In the annual report of the Provincial Board of Health of British Columbia, in April last, Dr. Fagan, the secretary, states as follows:

> "During the past year notices were sent out broadcast throughout the province, drawing attention to the value of typhoid inoculation in the prevention of this malady. In many parts of the province, with the support of many of the medical profession, this matter was eagerly taken up, with the result that a large amount of typhoid vaccine was distributed free of charge; and the results have been most gratifying. I respectfully recommend that the province continue in the wholesale distribution of this biological product, as its saving in life and health is most important from an economic point of view in the progress of the country.
>
> "Reports on the use of typhoid vaccine show:—
>
> "(1) Sixty-one thousand six hundred and twenty-two British soldiers immunized in India during 1911. Typhoid incidence in the immunized, 1.7 per thousand; in those not immunized, 6.7 per thousand —a case reduction of 75 per cent. Death-rate in immunized, 0.17 per thousand; not immunized, 1.15 per thousand—a mortality reduction of 85 per cent.
>
> "(2) Eighty-two thousand United States soldiers immunized up to July 1, 1912. The typhoid-rate dropped from 3.03 per thousand in 1909 to 0.3 per thousand in 1912—a reduction of 90 per cent.

"(3) Twenty-four thousand seven hundred and ninety-five Japanese soldiers immunized in 1909. Comparison of 12,915 immunized soldiers with 20,245 not immunized, living under the same conditions, shows one (1) case per thousand among immunized, 14.52 cases per thousand among those not immunized—a reduction in the typhoid rate among the immunized of 93 per cent.

"(4) Thirty thousand persons immunized in Memphis, Tenn., during a recent typhoid epidemic; 517 of these were children one to five years of age. The Department of Health Report says: 'We believe from our experience that it saved our city from a most serious epidemic of typhoid fever.'

"(5) Two thousand and forty-four persons immunized in Baltimore during 1911-12. Not a single case of typhoid occurred among these persons. In 309 hospital nurses and attendants immunized, there were no cases of typhoid. Among 82 nurses and attendants not immunized, there were seven cases.

"(6) One thousand three hundred and eighty-one nurses and hospital attendants in Massachusetts hospitals were immunized. Only two cases of typhoid fever developed. With immunization, typhoid incidence was nine times greater.

"That vaccination is harmless is shown by the fact that 62,000 anti-typhoid inoculations have been made in the United States Navy since January, 1912. Only a small fraction of 1 per cent of those immunized had reactions requiring excuse from duty; and of the 263,842 immunizations tabulated above, no harmful results followed."

The Weekly Bulletin of the Department of Health of the City of New York has the following under date of 26th April last:

"Anti-typhoid immunization has been practised by the department since January 1, 1913. When a case is reported, the home of the patient is visited to obtain historical data bearing on sources of infection. At the same time and with the assent of the practitioner in charge, immunization is offered to members of the household. Three doses are administered, seven to ten days apart, the first one containing 500 million killed bacteria in glycerin suspension, the others 1,000 million each. Reactions are observed and adequate histories are filed.

"Over twelve hundred injections have been given to about four hundred people, with no serious reaction. In the severest one on record there was nausea and vomiting, a marked chill, no rise in temperature, and considerable malaise. All of these symptoms subsided within forty-eight hours with no other ill effect. This reaction followed the first dose, the second and third causing only the mildest reaction.

"Among those immunized but one person developed typhoid fever. This case was a child already in the stage of incubation, who came down two days after initial dose. The course was exceptionally mild, an abortive form of the disease. It cannot be said in this case that the disease was possessed of little virulence, for two other children in the same family died from typhoid fever just before the culture was administered to the remaining members. There was no apparent reason for the favourable behaviour in the third case, except the benign influence of the injected culture.

"In a family of eleven there were two cases of typhoid. Immunization was offered to the remaining nine members. Eight accepted and did not con-

tract the fever. The one who declined immunization did develop typhoid very soon thereafter.

"In other instances within the experience of the department, persons exposed to the disease and refusing the preventive treatment have succumbed. On the other hand, none have developed it who have received immunization, with the single exception of the child mentioned, who was already infected and who ran so mild a course in the presence of such a virulent type of the *bacillus typhosus.*

"Foreign statistics corroborate these results. Thus there were 400 immunizations in the Maidstone asylum, England, during an epidemic. Among these but one per cent developed typhoid, whereas fourteen per cent among those not so treated contracted it.

"The typhoid incidence in New York city has been low, and the opportunities for immunization comparatively few. As the season advances the injections will necessarily increase in number with the increasing incidence of the disease, and it is expected that a reduction in the percentage of direct contact infections shown in previous years will take place.

"It has been thought inadvisable to administer the treatment to those having incipient or other tubercular lesions, as some writer intimates that exacerbations of the tuberculosis may follow such immunization. The department therefore will not inject the culture in the presence of manifest tubercular or other serious lesions, until this question has been settled by further observation."

Several addresses in favour of anti-typhoid inoculation have been given in this country during the present month by Sir William B. Leishman, K.C.M.G., F.R.S., professor of Pathology, Royal Army Medical College, London. Sir William was one of a committee of experts whose function was to get information in regard to all that was known of the subject and to conduct further research with a view to the improvement of the vaccine. This committee is now dissolved, having presented their final report. Their report recommended the universal adoption of typhoid vaccination in the army.

For the disinfection of typhoid stools the method devised by Dr. Kaiser, of the Hygienic Institute of Gratz University, remains the most simple and effective one. It consists in the addition of enough hot water to cover the stool in the receptacle and then adding about one-quarter of the entire bulk of quick lime (calcium oxide), covering the receptacle and allowing it to stand for two hours. The hydration of the lime generates enough heat to destroy the typhoid organism.

Linenthal and Jones, of the Massachusetts State Board of Health published the results of experiments made to test the efficiency of this method. They found that when hot water was used, as just stated, the temperature invariably rose to 75 degrees C. or over in ten minutes, and in twenty minutes it reached 85 degrees and often 90 degrees, and a temperature was maintained over 60 degrees for an hour and a half or longer. They next tested the effect of this method on the destruction of typhoid bacilli, and in all their experiments found that the typhoid bacilli were killed. Their conclusions are as follows:

"The addition of about a cupful of commercial unslaked lime and water to a typhoid stool will generate enough heat to kill the typhoid organism. While cold water may often suffice, it cannot be depended upon owing to the variable quality of the lime. Hot water from 50 degrees to 60 degrees C. will always give the desired results. The lime used should be in lumps, broken up in small pieces and distributed over the stool.

"We believe that this is a simple, efficacious method and should take the place of the various methods now recommended by local Boards of Health."

Typhus fever.—Between the 1st of January last and the 8th instant, eight vessels have brought to United States ports thirteen cases of typhus fever. These vessels were from Marseilles, Trieste, and Havre. Other cases subsequently occurred as the result of contact with the above cases. The nationalities affected were principally Turks, Armenians, Syrians, and Kurds.

The period of incubation of typhus fever is of sufficient duration to allow an immigrant to take passage after infection and reach a port in this country without showing evidence of the disease. Therefore steerage passengers from Western Asia and Eastern Europe in general, and from the above-mentioned localities in particular, should be examined carefully at the time of arrival at the quarantine stations, and subsequently examined by the officers of the service engaged in the examination of aliens to still further supplement the important work of endeavouring to determine what steerage passengers are most likely to convey the infection of typhus fever.

Tuberculosis.—Upon the results of the Friedmann treatment, Drs. Adami, Mackenzie, Caulfield, Harding, McCullough, Ross, Elliott, and Porter signed a report. Dr. Hodgetts, a member of the committee, being averse to making any report whatever, did not sign. The report was read at a general meeting of the Canadian Medical Association in London, Ontario, June 25, 1913:

> "In order to allay public excitement and to afford to the medical profession and people of Canada, an authoritative statement regarding the value of Dr. Friedmann's treatment, the Canadian Association for the Prevention of Tuberculosis nominated a committee of five members to study and report upon the cases inoculated by Dr. Friedmann at Montreal, Ottawa, Toronto, and London. The committee has added to itself those physicians who have under observation the cases treated in these cities. The committee thus constituted begs to report that it has carefully studied the case histories of the patients inoculated by Dr. Friedmann. These number altogether 161, namely, for Montreal 55, for Ottawa 10, for Toronto 81, for London 15.
>
> "As a result of our observations from March 11 to the present, the following conclusions seem justifiable:
>
> "1. The inoculations have neither constantly, nor frequently, been followed by any marked change in the clinical course of the disease
>
> "2. The cure or progress towards cure claimed by Dr. Friedmann for his treatment has neither constantly, nor even frequently, taken place in the time during which these cases have been under observation.
>
> "3. Thus upon investigation the committee finds that the results have been disappointing, that the claims made for this remedy have not been proved, and that nothing has been found to justify any confidence in the remedy."

Panama canal.—The completion of the Panama canal will be a triumph of medical skill even more markedly than of engineering skill. There is no reason why the French should not have completed the canal other than that they were not able to keep men alive in the Canal Zone. Even as late as 1903 it was officially reported that "the Panama canal district is one of the hottest, wettest and most feverish regions in existence. Intermittent and malignant fevers are prevalent, and there is an epidemic of yellow fever at times. The death rate under normal conditions is large." How large the death rate was is expressed in figures given by Col. Gorgas, chief sanitary officer of the Canal Zone. He reports that the death rate among the French employees was something more than 240 per thousand.

From a district that only nine years ago was considered almost uninhabitable, yellow fever has been entirely banished. There has not been a single case since May, 1906.

As a matter of fact, however, the actual cost for all of this has been less than one per cent of the total appropriations made for all purposes. Col. Gorgas states that when the canal shall have been finished, it can be shown that sanitation will have cost about $365,000 per year. With a population of 100,000 this would mean only 1 cent a day per person. The population of the Canal Zone is estimated at 150,000. The triumph is not simply the making possible the construction of the Panama canal, but even more so the demonstration that tropical regions which have been considered as hotbeds of infection can be made habitable by the expenditure of a sum well within the means of any fertile territory.

Circulars.—Circular letters were issued from time to time to your different officers, calling their attention to the various matters during the year connected with the appearances of epidemic diseases abroad.

Bulletins, etc., received.—The weekly Public Health Reports of the United States Public Health Service have been regularly received and are of great value, as are also the monthly bulletin from provincial, state, and municipal boards of health in Canada, the United States and other countries. The bulletins of the International Office of Public Health, Paris, and of the Sleeping Sickness Bureau, London, have been regularly received throughout the year, and in both cases spare copies have been distributed to the provincial boards of health.

New Quarantine Station.—In October last you advanced the unorganized maritime quarantine station of Summerside, P.E.I., to the position of a full regular quarantine station for the inspection, etc., of incoming vessels, and appointed Dr. A. A. McLellan as quarantine officer in charge. Prince Edward Island has the right of federal quarantine protection against disease from her sister provinces of the Dominion, as well as from abroad.

Additional Inspectors on Mail Steamers.—To meet the change from one mail steamer a week to three each week coming up the St. Lawrence, you appointed Drs. Bouillon and Lord, in addition to your former officer, Dr. Lepage, to meet incoming mail steamers at Rimouski, Que. Thus, one of your officers comes up the St. Lawrence on each of the tri-weekly mail boats, making a detailed inspection between Rimouski and Gross Isle.

Changes in Staff.—Last summer the death occurred of Dr. Watt, medical superintendent of the William Head quarantine station, B.C., and Dr. Hunter, the assistant medical officer and bacteriologist at the same station resigned. You have appointed Dr. Rundle Nelson as medical superintendent, but as yet no assistant medical officer and bacteriologist has been appointed.

Dr. Watt was a hard-working and valued officer, with sixteen years' experience in office. His removal by death is a loss to the service.

Official Visits, Inspections, etc.—On 13th June last I left, by your instruction, to inspect on the Atlantic coast. I visited the station at Grosse Isle, Que.; the Leper larazetto at Tracadie, N.B.; the quarantine stations at Chatham and St. John, N.B.; Digby, Halifax, Sydney, and Louisburg, N.S.; Charlottetown and Summerside, P.E.I.; Rimouski, Que.; and made a second visit to Grosse Isle, Que., in connection with the improvements being carried on there.

On August 14 I left for the Pacific coast. I inspected at Vancouver, Victoria, William Head and Prince Rupert, and the leper lazaretto at Darcy Island.

On my return trip I attended the annual meeting of the American Public Health Association at Colorado Springs, Colo.; and proceeded from thence to Regina, Sask., where I attended the annual meeting of the Canadian Public Health Association.

At that meeting I had the opportunity of conferring with the provincial health officers of Alberta and Saskatchewan, and subsequently, at Winnipeg, with the provincial health officer of Manitoba.

On October 5 I went, by your instruction, to St. John, N.B., in connection with an inspecting steamer, and the fumigating appliances and their scow.

Stations, etc., Grosse Isle, Que.—Vessels inspected at this station and its sub-station at Rimouski, 442. Persons inspected, 293,568. Admissions to hospital, 1,720. Diseases: Smallpox, scarlet fever, diphtheria, measles, röthelm, variola, enteric fever. Deaths in hospital, 16.

Five vessels reported smallpox. Nearly 7,000 persons were vaccinated.

During the year the following works have been practically completed: A new detention building for first-class passengers, extension of western wharf, 200 feet by 60 feet, bakery, carpenter's shop, plumber's shop, residences for bacteriologist, and for second medical assistant, cottage home for nurses, addition to hospital disinfection building. Works commenced: Breakwater at western bay, new story on dynamo and disinfecting building, water tank, and the burying of the water mains below the frost.

Rimouski, Que.—Coming up on mail steamers between this advance station and the main station at Grosse Isle, Dr. Lepage inspected 30 vessels and 45,487 persons; Dr. Bouillon, 28 vessels and 38,710 persons; and Dr. Lord, 28 vessels and 39,785 persons.

Halifax, N.S.—Vessels inspected, 385. Persons inspected, 203,810, being 46,311 more than last year. Infectious disease was reported by 36 vessels. The admissions to hospital were 204. The diseases: Smallpox, measles, scarlet fever, diphtheria, and chicken-pox. Deaths in hospital 2, one from diphtheria and one from measles.

Dr. J. J Hagerty, of the Grosse Isle staff, acted as medical assistant and bacteriologist during the absence of Dr. V. N. McKay at McGill University, Montreal.

St. John, N.B.—Vessels inspected, 173. Persons inspected, 37,949. The admissions to hospital were 35. The new buildings, bacteriological laboratory, assistant medical officer's house, and the houses of the boatmen and the assistant caretaker, have been completed, and are now occupied. A detention building for first-class passengers is now under construction. The station motor boat, *Eleanor,* has been thoroughly overhauled and improved.

Chatham, N.B.—Vessels inspected, 35. Persons inspected, 737. No quarantinable disease. Repairs have been made to the caretaker's house at the station, and a hot-water heating system introduced. A larger and safer inspecting launch has been provided

Digby, N.S.—Vessels inspected, 8. Persons inspected, 160. One case of measles occurred.

Sydney, N.S.—Vessels inspected, 126. Persons inspected, 3,426. One case of smallpox occurred.

Louisburg, N.S.—Vessels inspected, 34. Persons inspected, 909. One case of smallpox occurred.

Charlottetown, P.E.I.—Vessels inspected, 6. Persons inspected, 44. No quarantinable disease. The hospital has been provided this year with an ice-house.

Summerside, P.E.I.—This station was established by you on 31st October last, with Dr. A. A. McLellan in charge. No foreign vessels since inspected.

William Head, B.C.—Vessels inspected, 169. Persons inspected, 42,094. Admissions to hospital, 4; 2 cases of smallpox and 2 of measles.

The following changes in the staff have taken place in the period under notice: On June 18, Dr. J. D. Hunter, assistant medical officer, resigned, and I regret to have to report that on the 28th July following, Dr. A. T. Watt died in St. Joseph's hospital, Victoria, having completed over sixteen years of service as medical superintendent of William Head quarantine station and British Columbia quarantines.

During the late superintendent's illness in hospital, and up to the 22nd September, Dr. Bapty and Dr. Walker carried on the inspection work, and on the 22nd of September, Dr. H. Rundle Nelson was appointed medical superintendent.

A large number of improvements and additions have been carried out at the station since November last. A waiting and dressing room for ladies has been built next the ladies' baths, in the disinfecting building; and the extension of the powerhouse, for the handling of the mails and the accommodation of steerage passengers after bathing, will fill a long-needed want. The cold storage house will also be an improvement, the want of which has been long felt. With the exception of the superintendent's house, the assistant medical officer's house, and the second-class detention building, all the permanent buildings on the station have been brick veneered. This adds greatly to their appearance and will afford considerable protection against fire, whilst also reducing the annual expense of painting these buildings. The slate roofs, also, will not only add to their appearance, but will be a great factor in safeguarding against fire. The new fireproof buildings for the storage of gasoline, distillate, and sulphur will afford a very necessary protection for these highly inflammable materials. Railings have been placed along the roads, where they adjoin the waterfront, rendering them much safer for transit, more especially during the night. The roads in general have been kept in good repair, and the electric lighting of the whole station has been renovated completely, new poles being placed for both telephone and lighting wires, and the old system of arc lamps (of which there were eleven) has been superseded by twenty-five 500 w. Tungsten lamps, these giving a more even distribution of light, particularly around the land boundaries. By the use of these lamps, the capacity of the generating plant has been considerably increased. The telephone system has also been improved, and a central switchboard installed. A plot of ground, nearly an acre in extent, has been fenced off for use as a cemetery.

Prince Rupert, B.C.—No quarantinable disease has arrived at this port. The wharf has been completed and lights placed thereon. The house for the medical superintendent has been completed. The work of clearing the grounds and making preparation for the erection of detention buildings and disinfection building has commenced.

Tracadie Leper Lazaretto, N.B.—Patients at present, nineteen; fifteen of French-Canadian origin, two of English, one of Icelandic, and one of Russian. Ten males and nine females. Deaths during the year, four; new admissions, two. Treatment with Chaulmoogra oil in various forms is being continued. It is being now used in muscular injection in a compound of the oil with camphorated oil and resorcin. The antileprol, the purified product of Chaulmoogra oil introduced by Dr. Bayon, is about to be tried.

The two patients discharged as apparently cured, or at least freed from the disease, in February and November, 1912, remain in good health.

The devotion and care extended to the patients by the nursing religious sisters continue to be above all praise.

Darcy Island Leper Lazaretto, B.C.—There is one patient at this lazaretto, a Chinaman, waiting deportation under the regulations of the Immigration Department.

Public Works Health Act.—Your inspector for Eastern Canada under the Act, Mr. C. A. L. Fisher, states that the year has again been an exceptional one in the almost complete absence of infectious disease amongst the men employed on the various works of railway, tunnel, and canal construction coming under his inspection. He found the medical service given to be complete, hospital accommodation excellent, and the sleeping quarters and boarding of the men to be fully equal to the very good conditions reported previously. And as a rule the sanitary condition of the camps was good. During the year there was an average of 13,220 men employed, with 37 qualified medical officers in charge of hospitals and camps.

Your inspector for Western Canada, Dr. A. E. Clendenan, reports: "When one considers the roving disposition and unkempt habits of many of the employees on railway and irrigation works, it is food for thought that there is so little sickness and so few deaths from other causes than accidents." The epidemic diseases were much less than during previous years of work. The various contracts are reported upon in the order in which first visits were made to them, and the mileage (2,282) and number of employees (24,465) as found at that time.

I have the honour to be, sir,

Your obedient servant,

F. MONTIZAMBERT, M.D.

Director-General of Public Health.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 2.

(G. E. MARTINEAU, M.D.)

GROSSE ISLE, QUE., March 31, 1914.

SIR,—I have the honour to submit this my annual report as Medical Superintendent of the St. Lawrence Quarantine Service, for the year ending this day.

There were 442 vessels inspected this year at the Grosse Isle quarantine station and its subshead at Rimouski.

This total number of vessels inspected shows an increase of 58 as compared with that of last year. Out of the 442 steamers inspected, 262 were passenger boats, which is an average of 60 per cent on the whole, and an increase of 2 per cent over last year.

The personnel of ships inspected consisted of: 10,071 cabin, 59,007 intermediate, 157,372 steerage, 67,014 crews, 59 cattlemen, 45 stowaways, making a total of 293,568 persons, which is an increase of 82,891 over last year, and is the far largest number of passengers ever inspected at this station. It is also an increase of 223,457, or 76 per cent, if we compare it with ten years ago.

Every passenger vessel coming up the St. Lawrence this season landed infectious disease on one or more occasions, with the exception, however, of the ss. *Oceania,* from Trieste, which only made one trip.

The diseases so reported or discovered on inspection and landed here included: Variola, scarlet fever, diphtheria, measles, röthelm, varicella, enteric fever, febriculæ, mumps, and erysipelas.

Patients were landed on 139 occasions.

Deaths during the voyage were reported on 25 occasions, and were due to the following causes: Heart disease, 4; peritonitis, 1; bronchitis, 1; cedema of lungs, 1; syncope, 1; pneumonia, 3; broncho pneumonia, 3; convulsions, 3; lost overboard, 2; fracture of skull, 1; cancer of stomach, 1; accidental, 1; heat exhaustion, 1; suicide, 1; varicella, 1.

Births during the voyage were reported on ten occasions, 7 males and 3 females.

Passengers refusing to be vaccinated were reported on several occasions; but with the exception of twice, on the ss. *Ultonia,* May 8, and the ss. *Victorian,* May 31, their objections were overcome. On the two occasions above mentioned, the objectors were landed for the usual period of observation.

Smallpox infected vessels.—The following is a summary of those steamers on which smallpox was discovered or reported on board, together with principal data connected therewith:

VESSEL'S NAME.	FROM.	ARRIVED.	PASSENGERS.			CREW.	SICK.	LANDED.	
			1st Class.	2nd Class.	3rd Class.			Passengers.	Crew.
Canada	Trieste	May 14			2190	154	1	501	48
Pisa	Rotterdam	June 20			1148	80	1	166	10
Wittekind	Rotterdam	July 12			1265	100	1	219	10
Hartlepool	Marseilles	July 22				29			29
Megantic	Liverpool	Oct. 4	168	441	622	364	2	66	19

The delay caused to vessels by the landing, vaccination of the passengers and the disinfection of the steamers varied from six to twenty-one hours, and we have given all the despatch possible in all cases so that they suffered the least possible delay, while taking all necessary precautions to properly carry out our work.

The ss. *Hartlepool* having called at Sidney before coming up here, the smallpox patient was landed there, and permission was given for the steamer to proceed here with the rest of the crew, provided that the period of quarantine for observation be completed at this quarantine station.

All those steamers have received the usual quarantine handling with regard to the disinfection of infected compartments, vaccination of all passengers and crews, etc.

Nearly 7,000 persons have been vaccinated at this quarantine.

The number of persons landed at the healthy division for smallpox observation was 1,068.

Every smallpox patient treated at this quarantine hospital has fully recovered. No further cases have broken out amongst the different groups detained under observation, and they were consequently released upon expiration of the usual quarantine period of observation in such cases.

Suspected case of smallpox.—On November 14, the ss. *Corinthian,* from London, arrived at quarantine, and the ship's surgeon having reported a suspected case of smallpox on board, we examined carefully that case and found it so suspicious that we decided, as a matter of prudence, to take the same ordinary precautions as if we had to deal with a true case of smallpox, pending further developments; but after four days of observation, that case having proved not to be smallpox but simply measles, all detains (73, including crew) were at once released and permitted to proceed.

Amongst other steamers arriving at quarantine station in a very unsanitary condition, we might mention the ss. *Willehad,* from Rotterdam, which arrived on August 29, with 968 steerage passengers, amongst whom were many cases of scarlet fever and measles that had not been isolated on board. We found it necessary then to land all the passengers that had been exposed to contagion (207 in all), and to thoroughly fumigate the compartment occupied by these.

The work at this station is increasing every year, especially at the hospital, where we had this year 1,270 admissions, compared to 943 last year.

Deaths in hospital numbered 16, and were due to the following causes: Meningitis 3, measles 4, diphtheria 2, pneumonia 1, enteric fever 1, scarlet fever 5.

There was also landed for burial at quarantine the body of a child who died on board ss. *Canada* from convulsions.

Preventive treatment by serum has been given to 258 persons.

The large number of people admitted to hospital last season is calling again for the immediate construction of a new hospital to accommodate these, as the one that we have actually is too small and does not meet with our requirements. We had still, as in the previous years, to use tents, barns, old sheds, and also to open a supplementary hospital at the western division so as to isolate the different cases of contagious diseases.

We have always had at the hospital a number varying from 31 to 292 persons at the time. We had also to treat many cases suffering from different complications, such as diphtheria and scarlet fever, measles and scarlet fever, measles and diphtheria, etc., which rendered the situation worse; and many times we were threatened with the spreading of these different contagious diseases all over the hospital on account of lack of accommodation.

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I may state here that the above complications were partly due to wrong diagnosis of diseases on board vessels by ships' surgeons. It has already been reported by Dr. Aylen, first medical assistant at this station, who is especially in charge of vessels' inspection, that some of the medical men such as are employed by shipping companies do not seem to be at all at the height of their position; and I would respectfully recommend that necessary steps be taken so as to remedy this state of affairs. A fact that seems to prove that Dr. Aylen's statement is right is that in the course of last season about forty cases of different contagious diseases passed through this quarantine station without having been reported by the ship's surgeon. All these cases having passed during the night time, when we do not make any inspection, and when we have to trust the ships' surgeons' affidavit, the fault rests entirely with these last ones. All these cases have been returned to quarantine station after they had been discovered by the immigration officers at Quebec.

Laboratory.—The following is a summary of the work done at the laboratory during last season: Examinations for diphtheria 509, milk analysis 1, water 2, widal reaction 19, sputum examinations 10, fœces 6, urine 6; total 553.

I am pleased to be able to say here that the new laboratory commenced last year has been practically completed this year. A hot-water furnace and a "Blaugas" apparatus system have been installed therein, and all the appliances received. From now on we can count upon one of the most efficient factors in the discovery of certain infectious diseases. Within a few hours our bacteriologist can say whether suspected case is positive or negative. This is especially worthy in detecting the "carriers;" it is also of great importance for the diagnosis of certain diseases treated at the hospital, such as diphtheria and enteric fever, as it ensures the nature of the disease and gives a final decision in the release of the patients from the hospital.

Rimouski substation.—This advance substation continued this year to be in charge of Dr. L. F. Lepage. Two new medical officers, Drs. A. Bouillon and P. Lord, were appointed last spring in view of the increase from one to three of the weekly mail steamers from Europe. As done in 1912 by Dr. L. F. Lepage, these two new quarantine officers made the inspection last season of the two additional weekly mail steamers on their way up to Grosse Isle; so each mail steamer was sure to find on arrival at Rimouski a quarantine officer ready to come up with her for quarantine inspection, thus doing away with unnecessary delay either at Rimouski or at Grosse Isle, they stopping here only for landing quarantinable diseases.

The following is a summary of the respective work of each of the quarantine officers of this substation:

Dr. L. J. Lepage—		
Number of vessels inspected		40
Number of people examined—		
First-class passengers	4,004	
Second-class passengers	10,525	
Third-class passengers	20,403	
Crew	10,555	
Total		45,487
Number of vessels landing contagious diseases at Grosse Isle		11
Number of contagious diseases landed at Grosse Isle		20
Dr. A. Bouillon—		
Number of vessels inspected		28
Number of people examined—		
First-class passengers	2,311	
Second-class passengers	9,354	
Third-class passengers	18,278	
Crew	8,770	
Total		38,713
Number of vessels landing contagious diseases at Grosse Isle		13
Number of contagious diseases landed at Grosse Isle		48

Dr. P. Lord—		
Number of vessels inspected		28
Number of people examined—		
First-class passengers	3,509	
Second-class passengers	8,871	
Third-class passengers	17,842	
Crew	9,563	
Total		39,785
Number of vessels landing contagious diseases at Grosse Isle		15
Number of contagious diseases landed at Grosse Isle		113

Improvements.—A good deal of work has been done this year at this station. Amongst the most important, I might mention the following which have been practically completed: A new detention building for first cabin passengers; the extension of western wharf 200 feet by 60 feet; a new bakery with modern appliances in western division; a new carpenter shop; a new plumber shop; two new residences, one for bacteriologist and the second one for the second medical assistant; a new cottage for nurses; a new addition to hospital disinfection building.

There are also many other works that have been commenced but not completed, such as the concrete breakwater to protect property against flood in western division; the addition of a new story on dynamo and disinfection building to increase the number of shower baths and improve the system of disinfection for passengers detained under observation. There was also a certain part of the water system put under ground to protect it against frost; and the installation of a new 75,000-gallon water tank for necessary supply of water at quarantine has also been commenced.

Requirements.—A list of the works still required at this station has already been submitted in details to you; but I may perhaps be permitted to mention here some of the most important and urgent ones.

The first one would be unquestionably, as previously stated, the immediate construction of a new hospital so as to give a better accommodation and comfort to the people admitted there. In this regard I am glad to say that the contract for the foundations of this new hospital has been awarded; and I beg to hope that the work will be pushed with activity so that the erection of the hospital itself may be commenced, if possible, this year and completed as soon as possible.

A first step towards the realization of the construction of a deep-water wharf at western division has been taken this year by the lengthening of the old wharf (200 feet by 60 feet); but another lengthening of 200 feet remains to be done, and I have reason to hope that this will be carried out during next season.

As already stated in my last annual report, it will be also necessary to replace the steamer *Alice* by a larger boat fitted as an ice-breaker, this for the reasons already mentioned.

The old wooden sheds, which were built in 1846, should also be replaced by modern brick buildings and appliances.

When all these improvements will be carried out, the Grosse Isle station could be considered as one of the best equipped and most modern for carrying out the work required by the quarantine service.

The whole respectfully submitted.

I have the honour to be, sir,
Your obedient servant,

G. E. MARTINEAU, M.D.,
Medical Superintendent of St. Lawrence Quarantine Service.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 3.

(N. E. MacKay, M.D., M.R.S.C.)

Halifax, N.S., March 31, 1914.

Sir,—I have the honour to submit my report for the year ended the 31st of March, 1914.

During the year 385 vessels—the same number as last year—were inspected, and 203,810 persons classified, as follows: Cabin 4,657, intermediate 25,663, steerage 132,097, crew 41,383, cattlemen 2, stowaways 3, and wrecked sailors 3—46,311 more than last year.

We have had more than the usual amount of work during the year. Three immigrant steamers arrived in port with smallpox, and besides we have had more than our usual complement of minor quarantinable diseases.

Smallpox occurred on the following immigrant steamers: SS. *Ryndam,* from Rotterdam, June 16, 1913—1 case for New York; cc. *Chemnitz,* from Bremen, February 13, 1913—child died of smallpox on voyage; and ss. *Russia,* from Libau, March 6—1 case for Halifax.

Measles were found on the following steamers: SS. *Canada, Graf Waldersee, President Lincoln. Bremen, Frankford, Czar, Potsdam, Rhein, Brandenburg, Neckar, Ryndam, Patricia, Cassel, Hanover, Volturno, Russia, Noordam, Campanello, Dominion, Chemnitz, and Pallanza.*

Diphtheria on the following: *Graf Waldersee, Russia, Andania, Empress of Britain,* and *Alsatian.*

Scarlet fever on the following: *Czar, Palermo, Cassel, Campanello, Carthagenian, Kursk,* and *Aluania.*

Death was reported to have occurred on the following steamers, on arrival in port, from the following causes: *Palermo* (3): scarlet fever 1, inanition 1, diarrhoea 1; *Uranium* (6): pneumonia 2, bronchitis 2, inanition 2; *Campanello* (3): pneumonia 3; *Wellikind* (2): meningitis 1, heart disease 1; *Kursk* (3): alcoholism 1, inanition 2; *Wasgenwald* (1): oedema of glottis; *Pallanza* (1): pneumonia; *Frankford* (1): measles; *Main* (2): pneumonia 1, inanition 1; *Patricia* (1). pneumonia; *Birona* (1): ileus; *Russia* (1): pneumonia; *Cymric* (2): heart disease 1, senile decay 1; *Carthaginian* (1): diarrhoea; *Chemnitz* (1): smallpox (infant).

Diseases other than quarantinable were reported, viz., pneumonia, bronchitis, meningitis, heart disease, alcoholism, inanition, erysipelas, mumps, ileus, epilepsy, diarrhoea, senile decay, broken leg, abscess, and appendicitis.

Number of persons admitted to the hospital 204, classified as follows: Well (families of the sick), 128; measles, 59; measles and diphtheria, 1; diphtheria, 1; diphtheria and measles, 1; scarlet fever, 2; scarlet fever and measles, 1; scarlet fever and chicken-pox, 1; chicken-pox, 7; chicken-pox and measles, 1; and smallpox, 2. In some of the immigrant steamers, when two of the infectious diseases were prevalent, a child taking ill with one of them first sometimes developed the other disease during convalesence, *e.g.*, diphtheria and measles, chicken-pox and measles, etc.

Two deaths occurred at the station, one from laryngeal-diphtheria and the other from measles, which developed during convalesence from scarlet fever. A child developing one disease while recovering from another was due to want of prompt and efficient isolation on board the steamers in every instance.

We have had 616 smallpox contacts in quarantine during the year, 391 ex. the ss. *Ryndam,* June 16, 1913, from Rotterdam. These were detained for eighteen days from date of last exposure; 214 ex. the ss. *Chemnitz,* from Bremen, February 13, 1914; and 11 ex. the ss. *Russia*, from Libau, March 6. The contacts from the *Chemnitz* and *Russia* were detained for fourteen days only from date of last exposure, as the period of detention of smallpox contacts was reduced in the meantime to the normal incubation period of the disease. This was a step in the right direction. Only one case developed smallpox at the station.

In February, when the smallpox contacts were in quarantine, we experienced considerable difficulty with ice in Eastern Passage, as did also the agents of the *Chemnitz* and *Russia.* It so happened that we had at this time very cold weather, and ice formed in the channel rapidly. Provision and other supplies had to be hauled on the ice for about a mile, on a sled. In June, 1913, the contacts ex. the *Ryndam* were nice and comfortable, and everything was easily handled as it was summer weather

The detention buildings are not suitable for winter work. They are mere shells, and it is impossible to keep them warm and comfortable. Smoke in the main building (third detention) bothered us a good deal. This was due entirely to the length of the stovepipes, which filled up with soot every third day and blocked the draft. As a result, the pipes had to be taken down every third day to clean them of soot, which caused much dirt and confusion and annoyance to the people. We felt the need of a wash-house badly.

New buildings are much needed for winter work which could be properly heated with hot water or steam. Then, again, the scarcity of water is a great drawback to our work, and I do not know how this difficult problem can be solved successfully on Lawlor's Island. A new location for a station seems to me the only solution.

Dr. J. J. Heagerty, of Grosse Isle station, assisted me during the five winter months. I have great pleasure in testifying to the faithful and efficient way in which he attended to the work. It was quite a treat to have such an assistant.

All the buildings and plant at the station are in good state of repair. We need more substantial buildings, as the bulk of our work is, and will be, in winter.

All of which is respectfully submitted

I have the honour to be, sir,

Your obedient servant,

N. E. MacKAY, M.D., M.R.C.S., Eng.,

Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 4.

(R. C. Ruddick, M.D.)

St. John, N.B., March 31, 1914.

Sir,—I have the honour to submit my annual report of the St. John quarantine station for the year ended March 31.

There has been 173 vessels inspected at this station this year; this is an increase of 24 vessels compared with last year. The total number of persons inspected were 37,949, classified as follows: Cabin 997, intermediate 5,715, steerage 16,927, crew 14,310.

We admitted to our hospital 35 persons for treatment. Also 7 were detained for observation. The diseases discovered were measles, scarlet fever, mumps, and chicken-pox. All made good recovery.

Improvements.—All our new buildings (consisting of bacteriological laboratory, bacteriologist's house, boatman's house, and assistant caretaker's house) have been completed, and are now being occupied. Our quarantine boat, *Eleanor*, has been extensively overhauled and improved. A first-class detention building is now under construction.

Requirements.—Our most pressing need is a low-water wharf, where we can moor our quarantine boat. The quarantine boat, I am glad to know, has been advertised for tender, and I trust that by next winter's season the new wharf will be ready for her. As it is now, it necessitates Dr. Warwick living in St. John so as to be able to board the quarantine tug to board incoming vessels, as at many times on account of storms we cannot lighter to the tug from this station. The steward's house should be destroyed, as the sanitary conditions are dangerous to the occupants. A new house should be built for the medical superintendent, and the house he now occupies given to the steward. The water pipe has been laid about two-thirds of the way across the channel to the water main in West St. John. The work has been suspended for some cause unknown to me. I think the work could be completed in about three or four weeks.

I have the honour to be, sir,

Your obedient servant,

R. C. RUDDICK, M.D.,

Medical Superintendent.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 5.

(J. BAXTER, M.D.)

CHATHAM, N.B., March 31, 1914.

Sir,—I beg leave to submit the following report of the work done at this quarantine station for the last year, ending to-day.

The keeper's house has been raised two feet and the cement work carried up. A hot-water furnace has been placed with radiators through the whole house, making it now quite comfortable, and every part has worked satisfactorily.

A larger and safer gasoline launch has been provided, and twelve feet added to the boathouse to accommodate it. During the past season thirty-five vessels have been examined and 737 men. The crafts consisted of twenty-eight steamers, one bark, three barquentines, and three three-masted schooners.

There were no cases of quarantinable disease noticed among them.

I have the honour to be, sir,
Your obedient servant,

J. BAXTER.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 6.

(EDWARD DUVERNET, M.D.)

DIGBY, N.S., April 1, 1914.

Sir,—I have the honour to report that the following vessels were examined at this station during the year just ended: Four steamers, one barque, and three schooners. With the exception of one case of measles, these were found to be free from infectious diseases. Persons inspected, 160.

I have the honour to be, sir,
Your obedient servant,

E. DUVERNET, M.D.,
Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 7.

(Wm. McK. McLeod, M.D.)

North Sydney, C.B., March 31, 1914.

Sir,—I have the honour to forward my annual report of this quarantine station for the year just ended.

Since March 31, 1913, there have been inspected 126 arrivals. Of these, 22 have been sailing vessels, and the remainder, 104, steamships. Persons inspected, 3,426.

On July 10 ult., the ss. *Hartlepool*, Thos. Ward, master, from Marseilles, via Louisburg, arrived at quarantine, with fireman Wm. Proctor ill with virulent smallpox. He was removed to hospital, where recovery took place. Steward G. L. Fraser contracted the disease, and also recovered.

The crew were so effectively vaccinated by Dr. Morrison, quarantine officer at Louisburg, that they all "took.' The ship proceeded to Grosse Isle, under special instruction, on July 19.

I have the honour to be, sir,
Your obedient servant,
WM. McK. McLEOD, M.D.,
Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 8.

(D. A. Morrison, M.D.)

Louisburg, N.S., April 1, 1914.

Sir,—I have the honour to submit herewith my report for the year ended March 31, 1914.

The total number of ships inspected at this station for the year was 34—30 steamships and 4 sailing vessels. Persons inspected, 909.

On the 9th of July the British ss. *Hartlepool* arrived at quarantine with a case of smallpox on board, but as there is no quarantine hospital here, the ship had to proceed to Sydney next day and land the infected there for treatment.

There are times when the ice conditions would not permit a ship to make the port of Sydney, in which contingency a ship with quarantinable disease on board arriving here would be forced to proceed to Halifax, N.S., thereby entailing considerable loss of time with probably serious consequences to the infected person and others on board the ship.

I would respectfully urge on the department the absolute necessity of erecting a hospital at this station with the least possible delay.

All the other ships were free from quarantinable diseases.

I have the honour to be, sir,
Your obedient servant,
D. A. MORRISON, M.D.,
Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 9.

(PETER CONROY, M.D.)

CHARLOTTETOWN, P.E.I., March 31, 1914.

Sir,—I have the honour to submit my report for the year ended March 31, 1914.

There was no case of infectious disease at this station during the past year. In the neighbouring provinces there was no contagion in epidemic form. Vessels from all points north of the line of exemption were allowed free pratique.

There were six inspections of vessels from the West Indies and from across the ocean. Persons inspected, 44.

The hospital has been provided, during the past year, with a very suitable ice-house, constructed by the keeper from material supplied by the department, affording a much-needed convenience for the preservation of perishable foodstuffs.

The buildings are all in good state of repair.

I have the honour to be, sir,
Your obedient servant,

PETER CONROY, M.D.,
Inspecting Physician.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 10.

(A. A. MCLELLAN, M.D.)

SUMMERSIDE, P.E.I., April 17, 1914.

F. MONTIZAMBERT, M.D.,
Ottawa.

Sir,—In reply to yours of the 11th inst., I may say that I entered on my duties as quarantine officer for the post of Summerside on November 1, 1913, and since that time, with the exception of six weeks, the harbour has been closed.

No foreign vessels have entered since my appointment.

I have the honour to remain,

Your obedient servant,

A. A. McLELLAN.

APPENDIX No. 11.

(H. Rundle Nelson, M.D.)

Victoria, B.C., March 31, 1914.

Sir,—I have the honour to submit my first annual report for the year ending March 31, 1914.

The following inspections were made:

—	No.	Compared with preceding year.	
		Increase.	Decrease.
Vessels	169	15	
Passengers:—			
Cabin	5,974	1,034	
Steerage	16,432		1,221
Crews	19,611	5,886	

By this it will be seen that there is a total increase of 5,699 persons examined, though the steerage passengers have fallen off in number, probably owing to more stringent immigration regulations.

Below is a list of persons inspected, other than the passengers and crew of the boats:

Passage workers	6
Distressed seamen	13
Stowaways	58

A total of 3 births, 24 deaths, and 12 cases of non-infectious sickness have been reported at different times during the year.

The inspections have been carried out by the following medical officers:

	Vessels Inspected.
Drs. Watt and Hunter	51
Dr. Fraser	7
Dr. Bapty	25
Dr. Walker	7
Dr. H. R. Nelson	79

Only one vessel was quarantined during the year, the *Monteagle*, which arrived on 30th March, 1913, and was discharged on April 2 with a partial crew, the passengers being detained until the middle of April. Two cases of smallpox had developed, and the last of the patients was discharged during the week ending 3rd May. In the month of May two cases of measles were quarantined here, having been taken from the Japanese ss. *Sado Maru*, and these comprise all the cases that have been detained here during the year.

The following changes in the staff have taken place in the period under notice. On June 18, Dr. J. D. Hunter, assistant medical officer, resigned, and I regret to have to report that on the 28th July following, Dr. A. T. Watt died in St. Joseph's hos-

pital, Victoria, having completed over sixteen years of service as medical superintendent of William Head quarantine station and British Columbia quarantines.

During the late superintendent's illness in hospital, and up to the 22nd September, Dr. Bapty and Dr. Walker carried on the inspection work, and on the 22nd September I was appointed medical superintendent.

Up to the present, no assistant medical officer has been appointed to fill the vacancy caused by the resignation of Dr. J. D. Hunter.

A large number of improvements and additions have been carried out at the station since November last. A waiting and dressing-room for ladies has been built next the ladies' baths, in the disinfecting building, and the extension of the power-house, for the handling of mails and the accommodation of steerage passengers after bathing, will fill a long-needed want. The cold storage house will also be an improvement, the want of which has long been felt. With the exception of the Superintendent's house, the assistant medical officer's house, and the second-class detention building, all the permanent buildings on the station have been brick veneered. This adds greatly to their appearance, and will afford considerable protection against fire, whilst also reducing the annual expense of painting these buildings. The slate roofs, also, will not only add to their appearance, but will be a great factor in safeguarding against fire. The new fireproof buildings for the storage of gasoline, distillate, and sulphur will afford a very necessary protection for these highly inflammable materials. Railings have been placed along the roads, where they adjoin the water front, rendering them much safer for transit, more especially during the night. The roads in general have been kept in good repair, and the electric lighting of the whole station has been renovated completely, new poles being placed for both telephone and lighting wires, and the old system of arc lamps (of which there were eleven) has been superseded by twenty-five 500-w. Tungsten lamps, these giving a more even distribution of light, particularly around the land boundaries. By the use of these lamps, the capacity of the generating plant has been considerably increased. The telephone system has also been improved, and a central switchboard installed. A plot of ground, nearly an acre in extent, has been fenced off for use as a cemetery.

At the present time there is one Chinese leper detained at Darcy island, awaiting deportation during the month of April. The expense of his detention and conveyance to China should be met by the company which brought him into the country, fifteen months ago.

I have the honour to be, sir,
Your obedient servant,

H. RUNDLE NELSON, M.D.,
Medical Superintendent.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 12.

(R. L. Fraser, M.D.)

Victoria, B.C., March 31, 1914.

Sir,—I have the honour to submit my report for the year just ended. Coasting vessels are exempt from inspection. During the year I examined six ocean-going steamers. These were examined during the late Dr. Watt's illness. No case of contagious disease was found on any of them.

I have the honour to be, sir,
Your obedient servant,

R. L. FRASER, M.D.,
Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 13.

(L. N. MacKechnie, M.D.)

Vancouver, B.C., April 22, 1914.

Sir,—I beg to submit my report for the year just ended.

As coasting vessels are exempt from quarantine regulations, no inspections were made at this post during the year.

I have the honour to be, sir,
Your obedient servant,

L. N. MacKECHNIE, M.D.,
Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 14.

(H. Ernest Tremayne, M.D.)

Prince Rupert, April 1, 1914.

Sir,—I have the honour to make my annual report for the year ending March 31, 1914.

No quarantinable diseases of any kind have arrived at this port.

Early in the year the wharf was completed and lights placed thereon.

The house for the medical superintendent has been finished, and as soon as a water supply is provided will be ready for occupancy.

The work of clearing the grounds and making preparation for the erection of the detention building and disinfection plant has commenced.

It will be necessary this year to paint the hospital.

I have the honour to be, sir,

Your obedient servant,

H. ERNEST TREMAYNE, M.D.,

Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 15.

(J. A. Langis, M.D.)

Tracadie, N.B., March 31, 1914.

Sir,—Herewith I respectfully submit for your consideration my annual report as medical superintendent of the lazaretto at Tracadie, N.B., for the year ending March 31, 1914.

There are at present nineteen patients in the institution, ten males and nine females, fifteen of which are of French, two of English, one of Icelandic, and one of Russian origin.

We count four deaths and two admissions during the year.

The ages of our inmates vary from ten to eighty-four years. Fifteen are natives of this province. The four others are: One Canadian-born, one from Barbados, one from Iceland, and the last from Russia.

The health of the inmates during the year was, generally speaking, fair. They have been exempt from intercurrent illness. The causes of death were: One, congestion of the lungs; the patient had contracted a severe cold; he was in the second stage of leprosy. The three others were in the last stage of the disease.

As customary during the year, tours of inspection have been made to the families of our patients, who live in outlying parishes; they all keep free from the disease.

The two patients discharged in February and November, 1912, visited since my last report, are still in good health, though both, being in poor circumstances, have to work hard for their living.

Our treatment consists of Chaulmoogra oil in different forms, and general tonics. Recently, at the suggestion of your Director-General of Public Health, Dr. F. Montizambert, we are using a compound of Chaulmoogra oil, camphorated oil and resorcin. 5 cc. to 10 cc. of this medicine is injected in the gluteal muscles once a week.

By your generosity, we will soon be well supplied with Bayer's antileprol, and will give this medicine a fair test.

It is pronounced superior to Chaulmoogra oil, being its purified product, and as such can be taken in larger doses without gastric irritability. Digestion, assimilation and appetite, it is said, are not impaired as with the crude oil.

The patient reported in 1913 as being much improved, under the Nastin treatment, is still showing signs of improvement, though not having received any injections of the bacterial substance since last November. They all had such an aversion to the hypodermic needle then, that I have decided to give them a few months of rest. The new compound is more readily accepted by a few patients, for there is not such a burning sensation, after the injection, as with Nastin.

Our patients are pleased with the general management of the institution. They are also pleased with the efforts made to provide them with games and musical entertainments during the winter months, and for the tenderness and sympathy with which they have been nursed when ill.

In response to your call, I went to Winnipeg about the middle of March to bring a patient to the lazaretto. This patient is a Russian woman, aged 39, and an advanced case of leprosy of the nodular anæsthetic form, or mixed leprosy.

She was in the isolated ward of the General hospital, "The Annex." Her case being already diagnosed by the attending physicians, there remained nothing for me to do except to secure a special colonist car, and have it equipped for the journey to Tracadie, N.B., which took five days.

The nurse who had charge of the case at the General hospital accompanied the patient to her new home, the Lazaretto, and did all she could to make her comfortable in the circumstances.

I was delayed in Winnipeg for a few days, getting the car ready and arranging connections.

I have the honour to be, sir,

Your obedient servant,

J. A. LANGIS, M.D.,

Medical Superintendent the Lazaretto.

The Honourable the Minister of Agriculture,

Ottawa.

APPENDIX No. 16.

(Chas. A. L. Fisher, J.P.)

Montreal, March 31, 1914.

Sir,—I have the honour to submit the following report for the year ended March 31, 1914, as inspector under the Public Works (Health) Act, 1899, for the territory from Winnipeg east to the Atlantic ocean.

During that period I have personally visited and inspected all such works covered by said Act as have been brought to my notice.

The term has again been an exceptional one, in the almost non-appearance of contagious and infectious diseases among the men employed on the various public works of the Dominion coming under my inspection, but there was an outbreak of typhoid fever in three of the camps of the Canadian Northern works, east from Nipigon.

I am pleased to be able to report again that on my several tours of inspection of the public works of the Dominion in my district for the past year, I found the medical service given to be complete, and the sleeping quarters and boarding of the men to be fully equal to the very good conditions in that way reported previously.

The number of public works coming under the regulations of the Act, in the territory east of Winnipeg, have been comprised of railway, tunnel and canal construction.

The following is a detailed report of the works I have personally visited and inspected during the past twelve months, as coming under the regulations of the said Act:

NATIONAL TRANSCONTINENTAL RAILWAY.

This road is being built by the Dominion Government, and at present all the sections between Winnipeg and Moncton, N.B., have the steel laid, and are under final construction, or have been completed.

I am pleased to report that on my visits to the works on said sections I found, as previously, excellent hospital accommodation provided, and a duly qualified physician as district medical supervisor over each section of camps, which could be conveniently covered by him within the requirements of the regulations.

There had been no outbreak of contagious diseases, and the health of the men had been excellent.

I give below the extent and location of the camps, with other particulars of the works carried on by the various sub-contractors:

Superior Junction Section.—From Superior Junction east for 150 miles to junction of the western section, let to Messrs. E. F. and G. E. Fauquier. This is under contract to Messrs. O'Brien, Fowler and McDougall Bros., who have their headquarters at Superior Junction, Ont.

J. E. Joseph, of Pembroke, Ont., is the chief medical officer for the contractors, and J. M. McGrady, M.D., of Port Arthur, is the medical officer in charge of the work.

Superior Junction camps.—Four gravel pits operated by the contractors, and Messrs. Morris, Mackie and Co., being the sub-contractors; also a steel gang operated by the chief contractors.

About 700 men were employed, who were located in five camps, and housed and boarded in log and board dwellings by the contractors and sub-contractors, and the steel gang in boarding cars.

There were no cases of contagious disease, and the health of the men and the sanitary conditions were good. There have been a few minor accidents, and one death from fracture of spine. Two good hospitals are maintained on the work, one located about twelve miles from Superior Junction, and the other towards the east end of the contract. W. Graham, M.D., and G. E. Denison, M.D., have been the medical officers in charge, with John Brandon, M.D., as general medical supervisor. Five months ago W. Graham, M.D., resigned, and was succeeded by J. Mackenzie, M.D.

Nipigon Section.—From the east end of O'Brien, Fowler and McDougall Bros.' contract, east 75 miles. This is under contract to Messrs. E. F. and G. E. Fauquier, of Ottawa, who have sublet it to the Nipigon Construction Company, Limited, who have their headquarters at Nipigon, Ont. This work is about completed, the steel thereon having been laid by Messrs. O'Brien, McDougall and O'Gorman.

Missanabie Section.—This is under contract to Messrs. M. P. and J. T. Davis, of Quebec, who have sublet it to Messrs. O'Brien, McDougall and O'Gorman, the contract covering the route from the east end of the Nipigon work, for 150 miles farther east, to the junction of the Abitibi work, under contract to Messrs. E. F. and G. E. Fauquier.

Missanabie camps.—Messrs. O'Brien, McDougall and O'Gorman looked after the work themselves, there being only one sub-contractor, and about 1,200 men employed, who were located in thirteen camps, and housed and boarded in wooden buildings.

There were three deaths, two by falling bridge, and one by falling tree. The general health of the men was excellent, and the sanitary condition of the camps was good. There were two hospitals on the work. A. Henderson, M.D., of Cochrane, Ont., is the chief medical officer, and he had two assistants, one in charge of each hospital, as follows: Dr. Kinsey and Dr. Lipman. A train has been running on this section, and the work is nearing completion.

Abitibi Section West.—From about 8 miles west of the Abitibi river crossing, westerly for 100 miles. This is under contract to Messrs. E. F. and G. E. Fauquier, of Ottawa. Access thereto is had from Cochrane, Ont. A. Henderson, M.D., was the chief medical officer of the work, with residence at Cochrane.

Trains have been running over this section for a year, and there have been no camps thereon, the work being completed.

Abitibi Section East.—From about eight miles west of the Abitibi river crossing, easterly for 150 miles. This section is under contract to the Grand Trunk Pacific Construction Company, and was sublet by them to Messrs. Foley, Welch and Stewart, who had their headquarters at Cochrane, Ont.

Only one hospital has lately been maintained on the work. John McCombe, M.D., is the chief medical officer, with two district medical officers as assistants.

Abitibi East camps.—After the steel was laid and trains running, the Grand Trunk Pacific Construction Company took over the unfinished work, with Bell and McMullin as their sub-contractors.

About 400 men were employed, who were located along the line in three camps and several house cars, and boarded and housed in wooden buildings and cars by the contractors. There was one death, from accident. The general health of the men and the sanitary conditions of the camps were good. One excellent hospital was

maintained for these camps, located at Peter Brown creek, within easy access to the construction works and camps. D. R. Cameron was the resident medical officer latterly on the work, and had the assistance of Dr. C. O. Hamilton in the early part of the season. This work is now about completed.

Ontario and Quebec Section.—From the easterly limit of the Abitibi East Section, sublet to Messrs. Foley, Welch and Stewart, to a junction with the Quebec West Section at Weymontachene, Que., about 250 miles. This work is under direct contract to Messrs. Macdonnell and O'Brien, and entrance thereto is over their other contracts for the Transcontinental, lately completed by them from Harvey Junction, Que. John McCombe, M.D., is the chief medical officer of the work.

Ontario and Quebec camps.—Messrs. F. Munro and Co., Macdonnell Co., M. McCarthy, Doheny and Gordon, H. McKinnon, O'Brien and Martin, Shea and Egan. are the sub-contractors.

About 1,900 men are employed, who are located along the line in thirteen camps, and boarded and lodged in wooden buildings by the sub-contractors.

There was one case of erysipelas, one of measles, and one of phthisis. There were eight deaths: two drowned, one accident, one appendicitis, one phthisis, one acute diarrhœa, one embolism, one pulmonary tuberculosis, and one fracture of skull. The general health of the men and the sanitary conditions of the camps were good.

Three hospitals were maintained for these camps: No. 1 being a very large main hospital, with four separate wards, and located alongside the track; No. 2 was at Atik river; No. 3 is located at Peter Brown creek, as convenient as possible for the west camps of the work.

Doctors Thos. H. Jackson, J. P. Benny, J. C. Smith, and D. R. Cameron were the district medical officers of the work, residing in the hospitals. John McCombe, M.D., the chief medical officer of the work, resided at the hospital, west from La Tuque, and took charge of and gave the work his general supervision.

Nos. 1 and 2 hospitals are now closed, Dr. Benny transferring to other work, and Thos. H. Jackson, M.D., remains on the eastern end, with headquarters at Parent, and looks after the few men at present employed. Trains have been running over the whole section, and it is nearing completion.

CANADIAN NORTHERN ONTARIO RAILWAY.

Port Arthur, Sudbury Section.—This road is being built by Messrs. Mackenzie, Mann and Co., from Port Arthur to Ruel, Ont., a distance of about 550 miles, and when completed is to form part of the Canadian Northern transcontinental line from the Pacific to the Atlantic oceans.

Messrs. Foley, Welch and Stewart and the Northern Construction Co. are the chief contractors. Messrs. Mackenzie and Mackenzie, M.D.'s, are the chief medical officers of all the work, and have their headquarters at Winnipeg.

There were a number of sub-contractors, and about 5,000 men were employed, who were located along the line in about thirty-five camps, and housed and boarded by the contractors, and the various sub-contractors, in good wooden buildings. There were thirty-five cases of typhoid fever (confined to three camps), and nine deaths, two from an explosion, and seven from typhoid. There were eight hospitals located along the line, under the supervision of C. M. Burroughs, M.D., who made his headquarters at Sudbury, and he had during the year the following medical officers under him, and who resided at the various hospitals, viz.: S. R. Zealland, J. J. Middleton, E. M. Ellis, C. R. Young, N. J. Barton, Wm. Cody, E. Evans, R. A. Dick, E. Laurie, T. M. Sexton, W. W. Smith, and W. Wellman.

Section between Sudbury and Ottawa.—This is another part of the Transcontinental line, and is under contract from Sudbury to Pembroke, Ont., by Angus Sinclair, C.E., as chief contractor.

J. Mitchell, M.D., of Toronto, is medical superintendent of this section.

There were a lot of sub-contractors, and about 2,000 men were employed, who were housed and boarded by the various sub-contractors in wooden buildings and house cars located along the line. There were no serious diseases, but there were seven deaths, two from asphyxiation, one from heart failure, and four from drowning

The St. Joseph hospital at Sudbury and the hospital at Mattawa were used when necessary. W. N. Robertson, J. R. Boyd, H. G. Dowse, and M. G. Thompson, with Dr. Brandon, of North Bay, were the medical officers of the work.

Trains have been running over this section, and the work is about completed.

CANADIAN NORTHERN QUEBEC RAILWAY.

Tunnel under Montreal mountain.—This is a part of the work in connection with a Canadian Northern transcontinental railway, and will give that road a western entrance into the city of Montreal. Messrs. Mackenzie, Mann and Co., of Toronto are the chief contractors, and Mr. Sidney P. Brown is the chief engineer in charge of the work

About 600 men are employed, most of whom live in their own houses, and the balance in houses provided by the contractors. The men are boarded by the Consolidated Boarding and Supply Company, of Montreal.

There have been no contagious diseases or fatal accidents, but there were two deaths, one from fracture of the skull, and one from blood poisoning. An emergency hospital is maintained at the West Portal camp. Doctors Mackenzie and Mackenzie, of Winnipeg, are the chief medical officers, and J. A. Charette, M.D., of Montreal, is the medical supervisor of the men employed.

This has been an exceptionally speedy piece of work, and the engineers in charge deserve considerable credit therefor.

THE ALGOMA CENTRAL AND HUDSON BAY RAILWAY.

Main line extension.—From Mile 68 to a connection with the Canadian Pacific railway at Hobon, Ont., thence to a connection with the Canadian Northern railway at Oba lake, and thence to a connection with the Transcontinental railway at Hearst, Ont. The Superior Construction Co., Ltd., of Sudbury, Ont., T. J. Kennedy, of Sudbury, Ont., and Bourke and McGinnty, were the chief contractors.

About 1,000 men were employed, who were located in six camps distributed along the route, and were housed and boarded in wooden buildings by the said contractors or the Federal Commissary and Supply Co.

There were no cases of contagious disease or serious accidents, and no deaths.

The general health of the men, and the sanitary conditions of the camps were good.

Two good hospitals were maintained on the work, one at Hobon, and one at Hearst. R. McLean, M.D., of Sault Ste. Marie, Ont., is the chief medical officer, and had two assistants during the year as district medical officers on the work.

All work on this line has been closed down since last November.

WELLAND SHIP CANAL.

This canal is being constructed by the Dominion Government, and the work is divided into nine sections, four of which tenders have been called for, and the work let as under, viz.:

Section No. 1.—This has been let to the Dominion Dredging Company, who have their headquarters at Ottawa. The contract calls for one and a half miles of excavating, and one and a half miles of dredging. Camp No. 1 is situated at Port Weller, Ont., and up to the present only about 150 men have been employed, who were housed and boarded in frame buildings by the company. There had been one case of typhoid fever, but no deaths, the general health of the men being good. A camp hospital has been erected at Port Weller, and until a permanent hospital has been erected for the work, the General and Marine hospital at St. Catharines is being used.

John McCombe, M.D., is the chief medical officer of this section, and he has James J. Benny, M.D., as district medical officer thereon.

Section No. 2.—This has been let to the firm of Baldry, Yerburgh, and Hutchinson, of London and St. Catharines, and calls for five miles of excavation. Yale and Regan, and Hill and Leonard, are the only sub-contractors yet on the work. Only about 100 men are employed up to the present, who are housed and boarded in frame buildings by the sub-contractors.

There have been no serious diseases or deaths on the work, the health of the men being good. At the present time the General and Marine hospital at St. Catharines would be used if necessary.

John McCombe, M.D., is the chief medical officer of this section, and at present Dr. Benny is the district medical officer.

Section No. 3.—This has been let to Confederation Construction Co., Limited, with headquarters at Thorold, Ont., and calls for the excavation of two and one-half miles.

Camp No. 1 is at Thorold, and about 200 men are employed, who are housed and boarded in frame buildings by the Harris Abbatoir Company.

There were no cases of contagious disease, or deaths, the general health of the men being good. A camp hospital has been erected at Thorold, and at present the General and Marine hospital at St. Catharines is used when necessary.

John McCombe, M.D., is the chief medical officer of this section. and James J. Benny is the district medical officer thereof.

Section No. 5.—This has been let to the Canadian Dredging Company, who have their headquarters at Midland, Ont. They have appointed Doctors Colbeck and Streight, of Welland, to take charge of their medical service. Work has not yet been commenced on this section.

In order to secure a first-class medical service on all the sections of the Welland Ship canal, I beg to make the following remarks and suggestions, viz.:

That the medical service required is not the best possible service, but the best that can be given for the amount of money limited by law, and collectable from the men. For instance, on the Panama canal, the sum voted annually by Congress to the medical service is $1,600,000. Of this, $600,000 is used by what they term the Sanitary department, and fairly represents the amount required to make up for the difficulties of tropical medicine. The remaining $1,000,000 represents something over three dollars per man per month, for every workman. In addition to this, their hospitals at Colon and Ancon, as also the Sanitarium at the island of Tobogo, were largely built by the French, and served to give the American Medical Service a good start. In the province of Ontario, the deductable amount is fixed at one dollar per man per month, so that the medical service must make its plans accordingly. On looking over the work with this in mind, it is obvious that if the contractors are willing to come under the same service, the revenue will be increased, without a corresponding raising of expenditure, and so allow of more money being put into equipment, and the general improvement of the service, with resulting benefit to all.

The following suggestions are therefore submitted with the idea that they can be expanded or contracted according to the number of men coming under the service. The medical service should have its own doctor or doctors, and its own hospitals, etc. All construction work, in my experience, having proved this to be the only satisfactory method for the men, contractors, and the service itself.

In regard to this canal work, it is more necessary to have ample accommodation, for any outbreak of infectious disease, in order to guard the surrounding population, should a severe outbreak arise. Most contractors, or contracting companies, wish to do their utmost to assist in keeping free from disease any of their camps or works, so far as is possible, by adopting any reasonable suggestions which the chief engineer, the doctor, or the inspector makes.

In looking into the question of water supply in connection with the said canal work, I find that Thorold, together with other nearby towns, get their water from the present new Welland canal. Although it is prohibited to allow any drainage to enter this canal, the law is constantly broken by passing steamers, which dump their latrines directly into the water. The result of this is, of course, that the Thorold water contains sewage bacteria, and may at any time harbour the bacillus of typhoid. There is a still more dangerous source of infection, in the presence of 'Ten-mile creek,' which is a small stream arising a little above Thorold, and running down the new location to Port Weller, where it enters lake Ontario. It is infected with sewage from Thorold and other places by means of small tributaries. The wells used by farmers on the properties expropriated by the Government, offer the best water supply, and I would advise the contractors to give the 'water boys' orders to draw from these wells only.

In regard to latrines, I have to recommend the pit closet, provided that the pit is dug deeply, and made fly proof by a proper building above, and being kept cleanly, by the daily covering of the fæces by earth or sand, preferably mixed with lime. As to the disposal of slop water, I think a system of distributing porous pipes, such as are used in farm drainage, leading from the main discharge pipe, and buried about a foot below the surface of the soil, would give the best results. As to the disposal of garbage, old tins, etc., these should be either burned or buried.

Every doctor should be licensed to practise in Ontario, and experienced in this class of work where possible, and should confine themselves to the work on the canal, and thereby avoid friction with local doctors. They should attend the patients in the base hospital, visit all dispensaries at regular times, frequently go up and down the line, and thereby get in touch with the workmen, and should act as Public Health officers on their immediate work.

A good base hospital for each medical service should be established as soon as possible, and it should have ample accommodation for medical and surgical cases, together with a separate building for infectious diseases, and separate quarters for the nurse or nurses, together with laundry, store house, etc. The staff should consist of a female nurse or nurses, and a general servant. There should also be a male hospital orderly, and the doctor or doctors should make it their headquarters. This hospital should be located about the middle of the work covered by the service. On every contract where there is not a base hospital for the work, a camp hospital should be erected, placed in charge of a medical officer, and be provided with a full supply of drugs and instruments required in minor surgical work. As each of the sections cover several miles, there should be an ambulance, or good substitute, attached to each base hospital, and each camp hospital should be provided with a stretcher, interchangeable with that on the ambulance (if there is one), so that a man can be carried from the place at which he was injured, attended to in the camp hospital, and

later taken in the ambulance to the base hospital, without having to be taken from the stretcher, thus avoiding the injury resulting from movements of the fragments of a broken bone, etc.

Emergency tents, with the necessary furniture, should be on hand at the base hospitals, or other convenient place, so that they can be put up at any time should an emergency such as a severe outbreak of infectious disease occur

Medical chests, containing simple medicines, dressing, etc., should be provided at every camp, dredge, etc., and the timekeeper or clerk instructed by the doctor on its proper use. First aid can thus always be administered, and the patient kept in the best condition until the doctor's arrival.

I am pleased to say that the above suggestions, etc., are now being carried out by John McCombe, M.D., on his medical contracts on sections Nos. 1, 2 and 3 of the Welland Ship canal. In regard to the polluted water mentioned above, the employees on the work have been forbidden to drink it, and Doctor McCombe has had printed notices to that effect posted in various conspicuous places over the three sections covered by his medical service.

On the above public works in the territory east from Winnipeg, Man., during the term reported on, there was an average of 13,220 men employed, with 37 qualified medical officers in charge of camp hospitals and camps.

Cases of contagious and infectious disease.—Measles 1, tuberculosis 1, typhoid fever 35, erysipelas 1, phthisis 1; total, 39.

Deaths and causes as under.—Appendicitis 1, phthisis 1, acute diarrhœa 1, embolism 1, tuberculosis 1, typhoid fever 7, fracture of spine 1, fracture of skull 2, heart failure 1, blood poisoning 1, asphyxiation 2, explosion 2, drowning 6, accidents 5; total deaths as above, 32.

In closing this, my report for the twelve months ended March 31, 1914, I am pleased to again be able to draw your attention to the abatement of contagious and infectious diseases (with the exception of typhoid fever in three camps east from Nipigon), the general healthfulness of the men, the good sanitary conditions of most of the camps at said works, and the attention given by the companies, contractors, sub-contractors and medical officers in trying to comply with the requirements of the regulations under the Public Works Health Act, 1899.

In concluding this report, I beg to again suggest for your attention, that for the benefit and convenience of contractors and district medical officers of camps, and for the welfare of employees on public works, that the regulations at present applying under the said Act, be amended with as as little delay as possible.

I have the honour to be, sir,

Your obedient servant,

CHAS. A. L. FISHER,

Public Works Health Inspector.

The Honourable the Minister of Agriculture,

Ottawa.

APPENDIX No. 17.

(A. E. Clendenan, M.D.)

Edmonton, Alberta, March 31, 1914.

Sir,—I have the honour of submitting the following report for the year ending March 31, 1914:

The volume of work under my inspection, which covers Western Canada, has been greater this past twelve months than in any previous year. While the Canadian Northern railway and the Grand Trunk Pacific did not build up to their expectations of the earlier part of last season, their energies on the main lines to the Pacific coast and the unusual strides of the Canadian Pacific railway ran the total mileage very high.

When one considers the roving dispositions and unkempt habits of the employees on railway and irrigation works, it is food for thought that there is so little sickness and so few deaths from other causes than violence. Deaths due to accidents are mainly from a too great familiarity with dynamite, breeding carelessness; and also recklessly undermining dirt banks causing slides just big enough to seriously squeeze one or two men at a time.

During the first half of the past year, and for the three years preceding, there was an ever increasing demand for labour. If a man "took his time" to-day he could get a job to-morrow at the next camp or with a near-by company. Seldom does he go to work until his pittance is dissipated. Wages have kept increasing and the services rendered have kept lessening. Every average man has had an opportunity, if he possessed energy and ambition and morals, to have gotten a start to make a home. Excepting a fractional percentage, employees to-day are only averaging one week to ten days on a job, whereas four years ago they averaged about three weeks. The direct result of good times has been a degeneration of approximately fifty per cent. I note these observations to account for the discontent and murmurings so often seen in the newspapers, and to point to the fact that self destruction bears more heavily on the improvident, whom I check over, than contagious and infectious diseases.

The following contracts, which include all the public works subject to inspection in Western Canada, have been visited as frequently as the conditions called for:

Canadian Northern Railway.—On the main line between Edmonton, Alberta, and Vancouver, B.C., there has been during the entire year every stage of construction from breaking new ground to the finishing of steel bridges and extending all the way from 125 miles west of Edmonton to within 60 miles of Port Mann on the Pacific coast, a distance of some 600 miles. The west end of the work from Kamloops towards the coast is easily accessible from the main line of the Canadian Pacific railway. Track is now laid from Kamloops up the North Thompson river to mile 123, where a large bridge is under construction. Grading is nearly completed for another twenty-five miles, and then occurs the last two sub-contracts of ten miles each by S. D. Hogan and C. N. Parsons that closes the final gap in construction between the west end and the east end through the Yellowhead pass and toward Edmonton. The contractors are the Northern Construction Company. The work is all sublet, and the chief sub-contractors are Twohy Bros., A. Murdock, Grant Smith, Swan and Benson, Graff Construction Co., Armstrong

and Morrison, Martin Nelson, S. D. Hogan, Palmer Bros. and Henning, Phelan and Shirley, and C. N. Parsons. To trace the movements of those contractors and the large number of smaller ones from one part of the work to another would make an involved and unnecessarily lengthy report. At the time of first inspection this year there was 1,723 employees, and this number ran up during the summer to 4,011 in the early part of November. There has been a good medical service given by Doctors Mackenzie and Mackenzie, of Winnipeg and Vancouver. They employed on the grade Dr. Howell and Dr. Asselstine up the North Thompson; Dr. Ford, of Wallachin, Drs. Bennett and Irving, of Kamloops, Dr. Wightman, of Ashcroft, Dr. Jardine, mile 86 British Columbia, Dr. J. A. Briggs, mile 49, Dr. Niven, of Fitzhugh. Town hospitals were used when available along the main line of the Canadian Pacific railway. Throughout the rest of the line, grade hospitals were employed. There was reported: 1 case scarlatina, 14 typhoid, 3 pneumonia, 5 broken legs, 2 broken ribs, 1 broken back, 2 broken pelvis, 3 drowning.

Bassano-Swift Current, Canadian Pacific Railway.—This line was completed by finishing the grade between Bassano and Empress in Alberta. Janse Boomer and Hughes were the chief contractors, and sublet to Jackson, Clifford, D. Fitzgerald, McCorkindale and Janse, Noehrein and Mannix, Warren and Carson, Larsen, McDonald and Riley. There were 850 employees for a short time along some sixty miles of grade in charge of Dr. Pickard, who was employed by Dr. Ker and Anderson, of Basson. Hospital cases were sent to Bassano to Dr. Anderson.

Canadian Pacific Railway Irrigation Works.—The tributaries to the large ditches were dug during the season 1913, and this entire contract thereby completed after several years' work. Janse, McDonald Co., had the main contract, and sublet to Noehrein and Mannix, F. Jackson, Kimball Bros., Worth, McLaughlin, Larsen, Marshall, Calliway, McKinney Co., Janse Bros. and Tilley, Geo. Jackson, all of whom again let the smallest ditches to small contractors. J. McKinery contracted for all the wooden bridges, and Kettlewell and Sissons for the steel bridges. There were 1,815 employees in all. The mileage covered by the doctors can only be estimated at 120. The farthest out point, with the hospital at Bassano as the centre, was twenty-eight miles. There was on this work Drs. Anderson and Scott, of Bassano, Drs. Kenny and Fraser, of Brooks. The hospitals were employed in both towns. With the exception of a few cases of typhoid in a sub-contractor's camp, the health conditions were good this year. For the two years previously there was more typhoid on this work than on any other prairie contracts.

Canadian Pacific Railway Bow River Bridge, on the Suffield-Kipp line.—J. R. C. Macready was in charge for the company, and had 100 men engaged. Dr. Smith, of Medicine Hat, was in attendance and used the Medicine Hat hospital. Grading under contract for the previous year was finished by J. G. Hargreaves, and Brandenbury, with 65 men, who were looked after by Dr. Scott, of Bassano.

Canadian Pacific Railway Gleichen-Shepherd Cut-off.—J. A. Sangren had two camps of his own and sublet the remainedr to Goodman, Carlson, Rose and Wrixton, Smith and Hansen, Sandahl, and Swanson. One hundred and eighty-nine men were employed on the thirty miles of work, and were in charge of Dr. Salmon, of Langdon. None of these small camps in this district suffered from contagious or infectious diseases.

Canadian Pacific Railway, Coronation to Sedgewick.—Janse, Boomer and Hughes, with sub-contractor John Timothy and his sub-contractors did this branch with 185 employees. There were twenty-four miles. Dr. Hurlburt, of Coronation, with a hospital at Coronation, attended the men, and reported one case of measles, and two of pneumonia, with one death from the latter, besides minor ailments

Grand Trunk Pacific, Weyburn-Talmage.—John Bradley was the contractor. His sub-contractors were Winslow, Lindsay, Wright. There were 50 men on 13 miles looked after by Dr. Nickle, of Weyburn, Sask.

Grand Trunk Pacific, Boundary, in Sask.—Noyes and Davis, Gorden Wilson and Hansen, and Latimer, with 85 men, finished this 15 miles, and Dr. Murison looked after the men from Oxbow.

Grand Trunk Pacific, Moosejaw-Regina, and Moosejaw-Northwest.—Was finished this season by Marsch, Siems Carey, Hyland and Galloway and small sub-contractors, with 100 men on 7 miles, in charge of Dr. Bawden, of Moosejaw. No sickness existed.

Canadian Pacific Railway, Double-tracking Regina-Indian Head.—Jas. O'Connor was chief contractor, with headquarters at Qu'Appelle. His sub-contractors were Kuhns, Ryan Bros., Doherty, Powell and Beatty, Tracy, Butterworth, Cowan and MacPherson, Foshnier, Moore, O'Hanlan and Riley, Williams. There were 300 men on 40 miles of work, with Dr. Scott, of Indian Head, in charge. A number of camps were found to be without a proper outdoor service, but a letter of instructions to Dr. Scott to present to the contractors put matters right.

Canadian Pacific Railway, Double-tracking from Grenfell to Whitewood.—Was done by L. B. Wilmot, of Broadview, with Bryson, Sutherland and Waters as sub-contractors; 125 employees were on this 30 miles, and were taken care of by Dr. Wilmot, with a hospital at Indian Head.

Canadian Pacific Railway, Kerrobert to Consort, Alberta.—Janse, Boomer and Hughes sublet the finishing of this line to the Northern Construction Co., who in turn sublet to Madden, W. Hopgood, MacKenzie, Allen Bros., McLean, McDonald and Donald, Samson, Doyle, Dechene, and Panlon. There were 321 men on 60 miles, with Dr. Neville, of Kerrobert, in charge, and Dr. Preston on the grade. The hospital was 25 miles west of Kerrobert. No sickness of consequence occurred, and one death was caused by a kick from a horse.

Canadian Pacific Railway, Weyburn-Lethbridge.—The contractor was Edward Peterson and Co., who had one camp of his own and sublet the balance to Studer and Gorman, John Fitzgerald, Pearson and Son, Ericksen, Thomplins, Samson, N. Peterson, Keck Bros., Scholtz and Son, Shipman Bros., Caughey Bros., Olsen and Nelson, O'Connor, Higdon Ker and Brandenburg, McKenna, Higgins, Daly, Barnes Bros., Machelvey, Gorman Bros., Whelan, Duggan and Young, Berger, Kerr, Gibbs Bros. There were 1,196 men on the contract stretched along 145 miles. Dr. H. A. Cullum, of Notre Dame, and Dr. Pelletier, of Viceroy, did the grade work by using motor cars, and sent hospital cases to Dr. Smith at the General hospital, Swift Current, and Dr. Dawson at the Maple Creek hospital. There were only two typhoid and one death reported during the working season.

On the west end of this line from Stirling east was a 25-mile contract to H. G. Webster, who sublet part of the work to Hoglund, Dunwoody, Hargraves and Brooks, Miller, Gus Smith, Thacker, Rollings, Anderson. Only 100 men were at work finishing from the year before Water could only be obtained with difficulty from wells and creeks at a distance, but proved throughout the whole time to be sufficient from a health point of view. Dr. Harris, of Taber, with a hospital at Taber, was in charge of Webster's contract.

Canadian Pacific Railway, West End of Suffield-Kipp Line.—Was finished for 27 miles by G. H. Webster and six sub-contractors with 175 men, early last summer. Dr. Harris, of Taber, and Dr. Bryans, of Carmangay, were in charge.

Canadian Pacific Railway, Swift Current-Chaplin Double-tracking.—The Northern Construction Co. took this contract from the Canadian Pacific railway and sublet all of it to Boomer Hughes and McKinney, McCarty and McDonald, Wilson and Fralock, Milton, McKenzie, Enfold, Notham, Herbert; 311 employees on 60 miles were attended by Dr. McLean, of Swift Current, with a hospital at Swift Current, and he was assisted by Dr. Ross on the line. There was no sickness of consequence.

Hudson Bay Railway, from The Pas to Thicket Portage.—The chief contractors are J. D. MacArthur and N. Boyd. They have sublet to McMillan Bros., who have caches every ten miles. They have sublet to 800 station men. There were also 50 freighters at work. One hundred and sixty-five miles were covered by sub-contractors. Dr. Orok, M.P.P., of The Pas, is in charge. Assisting him are Dr. Hogan, of The Pas, Dr. Holmes at mile 67, and Dr. Beavens at mile 125. There were hospitals at The Pas, mile 67 and mile 125. Quite a proportion of the route was done from canoes. The record was extraordinarily good; only one death had occurred, and that from drowning.

Grand Trunk Pacific, The Brandon-Hart Branch.—Was finished early by John Bradley and 3 sub-contractors with 119 men. They were on the last 9 miles out of Brandon. Dr. Templeton, of Brandon, was in charge, and used the Brandon hospital.

Canadian Pacific Railway, Kenmay-Virden Double-tracking.—This work was finished by the end of July by McPherson and Dutton, Richards, and McRae. Four hundred men were on 32 miles, and attended by Dr. Templeton, of Brandon. Two typhoid cases had occurred.

Canadian Pacific Railway, Snowflake West.—This was a 9-mile extension done by D. F. MacArthur with 40 men, looked after by Dr. Smith, of Snowflake, Man.

Gimli-North, Manitoba.—Sixty men were employed on this 26-mile extension, and Dr. Raymond, of Gimli, was in attendance. Foley, Welsh and Stewart were the contractors.

Canadian Pacific Railway, Bergen-easterly, Manitoba.—Foley, Welsh and Stewart sublet this to John Marsch, who employed 300 men on their train and track and steam shovel gangs. It was a 3-mile contract in charge of Dr. Gunn, of Kenora. No sickness of importance was reported.

Canadian Northern Railway, Camrose-Coronation.—Noehrein and Mannix were the first contractors of 59 miles, on which was 202 men. The sub-contractors were MacArthur, Morrison and Cusach, Schultz, Kelly and Ferris, McLeod, Cummings, Nelson Bros., and other minor ones. Dr. Stewart, of Camrose, had the medical work, and Dr. Smith did the road work with a motor. No sickness of importance occurred. One complaint came in that was readily adjusted.

Edmonton-Dunvegan Railway.—This contract was being worked from mile 85 to 218 out of Edmonton, Alberta. His chief sub-contractors were Windsor, Negro, Fallis and Dechene, Murphy, MacPherson and Quigley, and many smaller men. There were 1,100 men on the 133 miles. Dr. Farquharson, of Edmonton, has charge of the medical service, and engaged Dr. Astoff at end of the steel, Dr. Gibson at Mirror Landing, and Dr. Hall at Grouard. The only thing of a contagious character to give trouble was an outbreak of prairie itch. One bad eye accident occurred, but otherwise there was nothing to note.

Grand Trunk Pacific, from Mile 53 West of Yellowhead pass (Alberta-British Columbia boundary) to Mile 319 British Columbia.—This is the last of the contracts on the Grand Trunk Pacific between Edmonton and Prince Rupert.

Foley, Welsh and Stewart are the first contractors. They have many large and small caches, manned by clerks, 500 scowmen operating mostly on the Fraser river, track-laying and ballasting and bridge and telegraph gangs. The extensive sub-contractors are Bates and Rogers, with six large camps of their own; McPeek, on wooden bridges; Canadian Bridge Co., on steel bridges; Burns Jordon Co.; A. E. Griffin; and Seims Carey Co. The last three firms have some 48 sub-contractors, who in some cases re-sublet. At one time, during a rush period, the number of employees on 265 miles of work ran up to over 7,000. It is now down to a quarter of that, owing to the connection rails being laid during April, 1914. Some hundreds of men will be engaged for a few months widening cuts and finishing for operation of road. Dr. Ewing, of Vancouver, had the contract for the medical service. His assistants, who were each located in a hospital, were Dr. Swenerton, of Fort George; Dr. Kearney, Willow Creek; Dr. Blakslee, mile 160; Dr. Leacock, Tête Jaune; Dr. Wagner, Mile 288; Dr. Ferguson, Fraser Lake; Dr. Park, Burns Lake. The medical service was not as good as it should have been, and at the present is largely replaced by the Grand Trunk Pacific surgeons who have gone on the ground for the operating department of the railroad. The exigencies of building this line were greater than on any other in the West, and the number of drowning and grade accidents was a somewhat higher percentage. The epidemic diseases were much less than during previous years of work through the mountains.

Canadian Pacific Railway Double Track, Rogers Pass Tunnel.—This is a 5-mile tunnel, with several miles of approach. These approaches are known at one end as Cambie Camp and at the other as Bear Creek Camp, and had respectively 220 and 180 men at work. Foley, Welsh and Stewart are the contractors, and expect to be from three to four years doing the tunnel. Dr. MacArthur is on the work for Dr. Ker, who is in charge, and a hospital has been erected at the Cambie end.

Canadian Pacific Railway, Double-tracking from Revelstoke to Taft.—Grant Smith and McDonell, Limited, have the contract. Their sub-contractors were Murchison Wilson and Co.; Salvas, Bright and McDonald; Westberg, Bruce and Maguire. Nine hundred and ten men were employed on 24 miles. Dr. Gilchrist, of Three Valley, furnished the line service, and sent hospital cases to Drs. Sutherland and Hamilton, of Revelstoke. There was no sickness to report.

Kettle Valley Railroad from Hope, B.C., to Coquahalla.—McArthur Bros., of Hope, and a sub-contractor, Bright and McDonald, had 500 at work on 23 miles, with Dr. Whitehouse, of Hope, and Dr. Gillis, of Merritt, attending the men from either end. Good provision had been made for accidents because of heavy rock work.

Canadian Pacific Railway Double-tracking, Kamloops west to Tranquille and east to Pritchard.—Grant Smith and Co., with three sub-contractors, Holly, Owens and Tupper; Schacht; and Zimmerman, covered the 50 miles, performing the work with 121 men. Dr. Burris Archibald and Burris, of Kamloops, using the Kamloops hospital, took care of the employees, and kept Dr. Agnew on the line. The general health was not good, and there was an outbreak of fifteen cases of typhoid, mostly from one camp down the Thompson river below Kamloops, and supposed to be due to Kamloops sewage in the river. Ignorant men and foreigners will continue to drink river water at any point in the stream and in any part of the West, regardless of warnings.

Kettle Valley Railway, British Columbia, from Hydraulic Summit east of Kelowna to Penticton at south end of Okanagan lake.—Grant Smith and Co. were the chief contractors on this part of the line. Their sub-contractors were Chew; Morrissy and Co.; Swan, Benson and Co.; Baker; Kimball Bros. and Campbell;

Griffin, Hunt Co.; King, Walsh Co.; Harmount and Co.; Dovenport, Gray Co.; Brandt Co.; Valley Construction Co.; Schacht Co. There were 1,730 employees on 76 miles. The general health of the camps was good. Dr. Ker is in charge of the medical service, and has on the work Dr. Bruce in Okanagan Mission hospital, near Kelowna, and Dr. Petman on the line, Dr. Cruikshank at Carmi, and Dr. Robinson at Narawanta. Among the serious cases reported was three typhoid, three crushed to death, one death from appendicitis, and one from hernia.

Canadian Northern Pacific.—The termini are Victoria, B.C., and Alberni, on the west coast of Vancouver island, and a line of 17 miles from Victoria to North Saanich. Moore and Pethick with Ledingham and Cooper, and Murdock and Co., with Proctor and Headman as sub-contractors, with 655 men, are soon to finish the work. Nettleton, Bruce and Echback, with 150 men, are on the North Saanich line. Dr. Bechtel, Dr. Luton, and Dr. Asselstine, employed by Drs. Mackenzie and Mackenzie, are the medical men, with one hospital in Victoria and two on the line. No infectious diseases outside of mumps has affected the camps, but surgical cases were common, with several showing long hospital records.

Canadian Pacific Railway, Esquimalt and Nanaimo Line, known as Comox Extension.—Moore and Pethick, Hoard and Cullerton were the three contractors. They had 385 men on 30 miles of work in charge of Dr. McNaughton, of Cumberland. The service was excellent, and no sickness of importance existed.

The different contracts are taken up above in the order in which first visits were made to them, and the mileage (2,282) and number of employees (24,465) is given as found at that time.

I have the honour to be, sir,
Your obedient servant,

A. E. CLENDENAN,
Public Works Health Inspector.

The Honourable the Minister of Agriculture,
Ottawa.

MISCELLANEOUS.

APPENDIX No. 18.

EXHIBITIONS.

OTTAWA, March 31, 1914.

Sir,—I have the honour to submit the following report of the operations of the Exhibition Branch of your Department for the fiscal year ending March 31, 1914.

On the beginning of the month of April, 1913, we were busy constructing our pavilion at the Ghent Universal and International Exposition, for which we had been awarded by the executive of the Exposition a piece of land measuring four hundred and twenty-five feet by two hundred feet (425 feet by 200 feet).

Our building, which was of the Greek-Renaissance style, covered an area of forty-five thousand (45,000) square feet, and was considered one of the best constructions on the grounds. It occupied a very favourable position on account of its being situated near one of the main entrances and surrounded by Belgian national constructions, such as the Palaces of the Cities of Brussels, Liege, Antwerp and Ostend; it was also in close proximity to the Belgian Colonial Palace, which had been erected by the Belgian Government at great cost.

Our exhibit was one of the few that were ready for the opening day of the exhibition, and this fact was very favourably commented upon by the newspapers and the public.

I shall not give you a detailed report of our exhibit, as it was practically on the same lines as at previous exhibitions, viz., a display of our agricultural, horticultural, forestry, fishery, and mineral resources. In the decorative display of grain and grasses we surpassed anything that we had attempted in the past, which no doubt contributed to a large extent to attract the numerous visitors that came to the pavilion.

A large quantity of literature on Canada was distributed to the public; the visitors very eagerly sought to obtain copies of our atlases and other publications.

Our information bureau was constantly kept busy answering the queries of people interested in Canada, and from all appearances our participation will bring good results.

The Ghent Exposition was not visited to a large extent by those classes that patronize the large hotels and shops; from that point of view the attendance was rather disappointing to the management of the exhibition. But I may say without fear of contradiction, that the attendance of the people in which Canada is most interested, viz., the populations of rural districts, was the largest that ever attended our exhibit at previous expositions; and I am glad to report that Canada was very popular among them, and our pavilion the most patronized building on the grounds.

Canada was awarded the Grand Prix for its collective exhibit.

The exposition closed on the third of November, 1913, and we proceeded at once to sort and pack our exhibit ready for shipment.

A few months after our section was opened to the public in Ghent, I commenced to pay attention to the preliminary work in connection with our intended partici-

tion at the Panama-Pacific International Exposition. I had the plans for our building prepared, so as to be ready to begin the construction work as soon as I arrived in San Francisco.

I left Belgium on November 22, accompanied by some members of this commission whose presence was not required for the completion of the work in Ghent, and arrived in San Francisco on the 14th of January, after a short stay in Canada, where some preliminary work had also to be done.

The construction of our building at the Panama-Pacific International Exposition is now well under way, and I have no doubt that our section will be ready for the day of the opening, February 22, 1915. We will spare no efforts to make our exhibit as attracive as possible, and I feel confident that the same will be a credit to Canada.

I have the honour to be, sir,
Your obedient servant,

WM. HUTCHISON.
Canadian Exhibition Commissioner.

The Honourable the Minister of Agriculture,
MARTIN BURRELL, M.P.,
Ottawa.

APPENDIX No. 19.

INTERNATIONAL INSTITUTE OF AGRICULTURE.

ROME, ITALY, June 7, 1913.

Sir,—I have the honour to submit the following report as to the proceedings of the General Assembly of the International Agricultural Institute, held at Rome, May 6 to 12, 1913.

The Canadian delegation, of which Mr. Philemon Cousineau, K.C., LL.D., was the chairman, consisted also of Mr. R. F. Stupart, F.R.S.C., F.R.A.S.C., director of the Canadian Meteorological Service, who had also just attended a meeting at Rome of the International Meteorological Committee; Mr. H. G. Dering, M.V.O., first councillor of the British Embassy at Rome; and Mr. T. K. Doherty, LL.B., chief officer of the Publications Branch of the Department of Agriculture and Commissioner of the International Agricultural Institute for Canada.

The British delegation consisted of Sir Sydney Olivier, K.C.M.G., permanent secretary of the Board of Agriculture and Fisheries; Sir Robert Wright, president of the Department of Agriculture for Scotland; Mr. T. P. Gill, secretary of the Department of Agriculture and Technical Instruction for Ireland; and Mr. H. G. Dering, M.V.O., first councillor of the British Embassy at Rome, and delegate on the Permanent Committee of the Institute for Great Britain and other British Dominions, including Canada, which is indebted to him for particularly valuable service in this connection.

Sir Edward Buck, K.C.I., who represents India on the Permanent Committee, was also a delegate to the General Assembly. The Union of South Africa was represented by Mr. J. B. Moffat, director of the census.

The friendly feeling, good fellowship and collaboration between the members of the British delegation and the members of the Canadian delegation were productive of excellent results.

There were large representations from the leading countries: Germany sending eight delegates; Austria, five; Hungary, six; Belgium, four; Spain, four; the United States, five; France, six; Italy, eleven; and Russia, five.

The opening meeting of the General Assembly was held on May 6, when Professor Vittorio Emanuele Orlando, member of the Italian Chamber of Deputies, was elected president of the Assembly; Baron Bernhard von Ehrenfels, president of the Royal Imperial Society of Agriculture, Vienna, member of the Diet for Lower Austria; and Mr. de Vuyst, director-general of the Agricultural Bureau of the Belgium Department of Agriculture and Public Works, were elected vice-presidents.

Their Majesties the King and Queen of Italy, whose visit to the palace of the Institute has, at preceding General Assemblies, been made at the opening of the proceedings, took place this year on the Sunday immediately preceding the close, so that the one hundred odd delegates from the United States, who had just arrived in Rome to begin their investigations of European Agricultural Credit Systems, might have the opportunity of being presented to Their Majesties at the same time as the members of the General Assembly. The Marquis Cappelli, permanent president of the Institute, read an address of welcome to the Italian sovereigns, and thanked His Majesty for his interest in and support of the Institute. The Honourable Mr. Nitti, Italian Minister of Agriculture, Industry and Commerce, replied on behalf of His Majesty with cordial words of welcome to the delegates. Complimentary addresses were also read to Their Majesties by the American Co-operative Credit delegation. This personal attention accorded to the delegates by Their Majesties was the source of great encouragement and inspiration to us all.

The business transacted by the General Assembly was divided under the following heads:

1. Administration—
   (*a*) Review of the past work of the Institute.
   (*b*) Finance.
2. Agricultural statistics.
3. Statistics of live stock.
4. Commercial statistics.
5. The protection of birds.
6. Statistics of fertilizers.
7. Dry farming.
8. Agricultural book-keeping.
9. Agricultural meteorology.
10. The diseases of plants.
11. Statistics of co-operation.
12. Insurance against loss by hail.

Reports with reference to each of these subjects, prepared by a member of the Permanent Committee of the Institute appointed for the purpose, together with the conclusions of the Permanent Committee thereon, were submitted to the Assembly and referred respectively to one of four large committees appointed to consider the various subjects in detail.

I.—Administration.

Review of the past work of the Institute.

A report as to the work of the Institute during the two years which had elapsed since the last General Assembly, in May, 1911, was presented by Marquis Cappelli,

president of the Institute. Reference can be made here to only a few of the leading features of that very interesting report.

In May, 1911, the States represented were 48 in number; they are now 53. The five new States to adhere are Paraguay, the Union of South Africa, Guatemala, Dutch East Indies, Tripolitania and Cyrenaica. The adherence of these additional States affords valuable evidence of the esteem in which the Institute is held and the useful results it is beginning to yield.

Two years ago the publications of the Institute had hardly been started. The first Bulletins of Agricultural Statistics had appeared a little more than a year before, and it was only six months previous to the last Assembly that the publication of the large Bulletins of Agricultural Intelligence and Plant Diseases and of Economic and Social Intelligence had commenced. These latter publications had, however, not yet assumed their normal form. At the cost of considerable effort they have succeeded in increasing their intrinsic value and in rendering their publication more regular, while provision has already been or is being made for publishing editions in six different languages, which is a matter of considerable difficulty. Apart from the special contribution of 25,000 francs which the Institute grants for each language, principally for the purposes of propaganda, the countries speaking the language defray the expenses of translation.

In these editions in French, English, Italian, German, Spanish and Hungarian, almost 600,000,000 people may read in their own languages the publications of the Institute. There could be no better proof of the value of the publications than the fact that the countries at the head of agricultural progress are publishing editions of them in their own language at their own expense.

The president reviewed the work of the four different Bureaus: (1) Bureau of the General Secretary (including the administrative and financial divisions); (2) the bureau of General Statistics; (3) the bureau of Agricultural Intelligence and Plant Diseases; (4) the bureau of Economic and Social Institutions.

Under the first head the president explained the financial situation of the Institute, which called for an increase of the regular contribution by the adhering States, from 1,500 francs per unit, which has been paid up to the present time, to 2,500 francs per unit, from January 1, 1914. It is expected thus to increase by about $60,000 the normal annual receipts, which amount now to about $163,000. In the last two years there had been difficulty in keeping the expenditure within the limits of the ordinary estimates. The reserve fund, which in December, 1910, amounted to about $133,000, had been reduced in December, 1912, to about $109,000.

This decrease is to a small extent due to the impossibility of keeping the ordinary expenditure within the limits of the ordinary estimates; for the most part it is due to extraordinary expenditure. The necessity of expenditure of this character will be also felt in the future, both for requirements which may be already foreseen and for others which cannot be foreseen, but which may be expected. A few of the first kind are mentioned. Sooner or later there will have to be contributions to editions in other languages. Besides, they will have, as soon as possible, to reduce the rate of subscription, in order that the circulation of their bulletins may be increased. This, as is evident, will, for some years, mean a reduction of income, which will afterwards return to the former amount and perhaps exceed it. However, to meet the deficit in the first period, they have only their reserve fund to count upon. The time is perhaps not far off when, for a year or two, they will have to devote the generous contribution of the King of Italy to the enlargement of the building which they are beginning to find too small, both for the requirements of the offices, and for housing the less important publications, for which they have had to find a place outside the building of the Institute. The contribution of the King of Italy ($60,000 annually) is given in the first place in order that the Institute may have a palace worthy of itself

in Rome, and in the second place, to be used with the contributions of the States for ordinary working purposes.

If this necessity occurs, a considerable amount will have to be drawn from the reserve fund for a year or two. Not only will the reserve fund have to be re-established and increased with a view to future requirements, but the ordinary expenditure itself will be larger. The heads of the bureau are asking for additional employees, etc. For all these reasons, they have requested the States that the unit of contribution may, from 1914, be raised to 2,500 francs.

The president invites attention to the International Year Book of Agricultural Legislation, of which the Institute has just distributed the second issue for the year 1912. This is a collection of all the laws relating to agriculture promulgated in the whole world. Important laws are given in full, in French, the official language of the Institute. In the case of those of less importance only the title and exact date of publications are given, or an extract from the law and executive regulations. Dr. Dade, president of the German Landwirtschaftsrat, writing in the *Zeitschrift fur Agrarpolitik,* has truly said of this publication: "This manual is indispensable for all bodies representing agricultural interests, for Government functionaries, members of Parliament and economists. This one publication is in itself sufficient to convince the world of the economic utility of the Institute." The Year Book contains an index arranged according to subject-matter and States, and will be of the utmost importance to statesmen of every land. Desires have been expressed for editions at least in English and in German, but the Institute has not the requisite funds.

It is unnecessary to refer here to the observations made by the president concerning the other bureaus. It is more convenient to take up separately each of the four bureaus whose work was considered at the General Assembly by four corresponding committees. Under the heading of each committee we shall group the subjects (already enumerated) and deal with each group in such manner as to reflect, although briefly, the deliberations and the decisions of the General Assembly.

FIRST COMMITTEE.

(Administrative Questions.)

Decisions I-VI.—The General Assembly having heard the administrative report of the president, heartily approved it, and presented congratulations and thanks to the president, to the members of the permanent committee and to the officials of the various services of the Institute. The president was also requested to present to His Majesty the King, who, by his presence at the Institute, had given evidence of his continued interest, the expression of the respectful homage and deep gratitude of the Assembly.

As in 1911, the permanent committee is once more requested to forward to the Governments reports on the questions to be discussed at the next General Assembly at least two months in advance of the date fixed for its opening, which would be in May, 1915.

On the proposal of Mr. Lesage, of Paris, the permanent committee were requested to study the question of preparing and publishing a vocabulary of the principal terms used in agriculture.

The proposed increase of the annual contribution to the maximum provided by the Convention of 1905 was approved, as were also the financial statements for the years 1911, 1912 and 1913. The sum of $220,000 was voted for 1914, and an equal sum for 1915, plus any balance that might remain from the previous year.

SECOND COMMITTEE.

Agricultural and Commercial Statistics—Agricultural Statistics.

Decision I.—The General Assembly, deriving its inspiration from the ideas that led to the creation of the Institute, expresses the wish that the adhering Governments use every endeavour to assist the Institute in accomplishing one of its principal missions, a mission which consists in organizing a regular international service of exact, rapid and complete information concerning animal and vegetable production and concerning the consumption, commerce, and prices of agricultural products. The permanent committee is invited to make such budgetary provision from the general sums voted as will insure as completely as possible for the future the development of such a service.

It was intended by this decision to insist on the great relative importance of this work, Dr. Müeller, who had presented a very able report on the subject, wished to have it stated that this was the Institute's "principal mission." Mr. Lesage's compromise amendment calling it "one of the Institute's principal missions" was accepted.

Decision II.—The Assembly, taking note of the improvements which have been introduced or are intended to be introduced into their agricultural statistical services, believes that, in order to place the Institute in a position to furnish a rapid, complete and effective international service of information, further efforts should once more be requested of the adhering States. The permanent committee are therefore invited to ascertain, product by product, the improvements that each of the States should introduce into its statistical system for the purpose of establishing the international service on solid basis; the results of the investigation to be communicated to each Government with a request that it adopt such measures as will meet the requirements of the Institute's services.

Upon the proposal of Mr. Doherty, one of the Canadian delegates, the expression "rapid" was introduced into the foregoing decision, so as to emphasize the relative importance of the element of speed in gathering and transmitting the crop reports, first from the field to the National Central Office, next from the National Office to the Institute, which should with equal speed cable summaries to the world. At present during the growing season the reports are cabled to the Institute at dates varying between the 8th and the 15th of the month, the latter date being the limit allowed by the Institute, and the Institute issues its Bulletin on the Saturday nearest the 20th of the month, that is on dates varying between the 17th and the 23rd. At this late date the news has become stale; the speculators and the commercial community are in possession of the facts communicated to the press in the different countries at intervals between the 8th and the 15th. The issuing of supplements by the Institute is not sufficient. It is desirable to request the Governments to allow their field correspondents a shorter delay for transmitting reports to the Central Statistical Office. That delay should be cut down to four or five days, instead of the eight or ten as at present. If necessary, statistical centres should be established at points which are too far distant from the Central Office for rapid transmission by mail, so that at such points summaries could be prepared for a whole province or a whole district and telegraphed to the Central Office. This is done in the United States; with the result that the crop report is issued on the 7th of the month.

Mr. Doherty made a special communication to emphasize these points, and to define more particularly what meaning might be ascribed by the permanent committee to the word "rapid" in the decision in question. An educative campaign should be undertaken, so that a great majority of the important producing countries might recognize the reasonableness and practical benefit of greater speed. Later the

Institute might fix the 10th of the month as the limit for the transmission of the data by the national services; enabling the Institute, by noon the next day, to cable to the adhering countries a summary of the data, which would appear a day or two later in greater detail in the monthly Bulletin. The same argument would apply equally to the commercial statistics and prices which are published in the same Bulletin.

The proposal for such an effective service could not be accepted by the Institute for immediate action, but by the next General Assembly (May, 1915) the adhering Governments might be prepared to undertake the consequent responsibilities.

An assurance was given by the president that Mr. Doherty's proposal would be placed on the Order Paper for discussion at the first meeting of the permanent committee after the holidays. On January 24, 1914, the second commission of the Institute reported favourably through its president, Dr. Müeller, of Germany. The permanent committee, at its meeting of March 12, concurred and declared its belief in the possibility of bringing about the earlier publication of the "Bulletin of Agricultural Statistics," and instructed the general secretary to communicate with the various Governments to endeavour to secure from them a more rapid transmission of official data.

Decision III.—The Assembly solicits co-operation of the Governments towards making the International Agricultural Year Book a complete work for purposes of comparison, relating to the production, commerce, consumption, and prices of agricultural products.

Decision IV.—A similar appeal is made to the International Statistical Congress —whose members are to meet in Vienna next autumn—asking that they take up the question of the unification of the statistics relating to cultivated areas and to preliminary, provisional and final estimates of yield, in such manner as to make specific recommendations. The permanent committee are invited to prepare a scheme of the proposals that should be submitted to the members of the Institute in time to help them to solve the question within the present year.

Decision V.—On the proposal of M. le Chev. de Weil, one of the delegates for Austria, the Governments are to be requested to report: (1) On the Crop Correspondents' methods of procedure in the field in furnishing to the Statistical Offices the elements of inquiry into the condition of crops; (2) stating precisely whether they simply give their appreciation on the appearance of the growing crops at the moment of the investigation (for instance in the form of such notes as: "very good," "good," "pretty good," etc.), or whether they formulate their opinion according to the presumed extent of the future crop, in giving, for instance, indications of the probable average yield per unit of area; (3) what reasons have led to the adoption of the method in use, giving, if need be, the reasons which would not permit following in the future the method advocated in this regard by the Institute.

The permanent committee are requested to see that in the future there may be made in the publications a very clear distinction between the estimates made before harvest and those made subsequently.

Live Stock Statistics.

The proposals presented on behalf of the permanent committee were in general adopted. A few changes were made in agreement with the reporter, M. de Pozzi, of Austria, for the purpose of giving to the resolutions more precision and clearness.

Decision I.—The Assembly believes it to be absolutely necessary, in the national and the international interests, that each State should have the benefit of live stock

statistics. Where none exist, or where they are not organized in such manner as to satisfy the requirements of an international service, request is made that such services be organized as soon as possible.

Decision II.—The Assembly is of the opinion that such statistics should make known every year the number of heads of each kind, and for each of the classes specifically mentioned hereunder. If the immediate creation of so detailed an enumeration is not, in certain countries, possible, these are requested at least from the year 1920 to make a decennial census of such character and compile annual statistics of a more limited scope.

Decision III.—The period recommended for the enumeration, in either case, is that comprised between the months of December and April, provisional results at least to be published within a delay of three months after enumeration. This recommendation is the result of a compromise between the delegates who desired the adoption of a uniform fixed date, and those who wished to leave some latitude to the various Governments to permit of their choosing for the enumeration the date when the effective number of their live stock would be at its maximum, or a date that would accord with administrative necessities.

The Assembly asks for the adoption of a classification, which, while corresponding best to the particular conditions of each State, may render possible the tabulation of the data under the following classifications:

Horses.—(1) Colts and fillies; (2) stallions used for breeding purposes; (3) animals not comprised in the preceding classes.

Cattle.—(1) Animals under one year; (2) steers, bullocks and heifers; (3) cows; (4) bulls; (5) oxen.

Sheep.—(1) Lambs and ewes under one year; (2) rams one year or over; (3) ewes one year or over; (4) sheep one year or over.

Swine.—(1) Young pigs; (2) pigs in the course of fattening; (3) sows; (4) boars.

The Caprine Species.—Total number of the species.

The preceding proposal, as submitted by the permanent committee, which comprises two lists of classes for each kind of animal, relating one to general census periods and the other to monthly statistics, was changed as above to place it in harmony with the decision reached to lay down as a principle that it was desirable to see established live stock statistics as detailed as possible. Consequently the above single list was drawn up, and it was well understood that, in the case of annual statistics of a more limited character, the enumeration would involve the fusion of all or of a part of the classes provided in the schedule for each of the species, but would nevertheless remain within the table as outlined. so as to render easily comparable between themselves various sets of statistics. The classes were established after careful examination and much discussion, with a regard for all interests concerned. The able statements made by the delegates for Holland were chiefly responsible for the changes made in the original resolutions; a compromise which was skilfully managed by Mr. Lesage, of Paris.

Decision V.—The permanent committee are requested to present to the next Assembly a detailed report on the systems of live stock statistics in the various countries.

Decision VI.—The Assembly is of the opinion that such statistics would be happily completed by the publication of information, as detailed as possible, on the

consumption and commerce in meat, and instructs the permanent committee to investigate and report on the subject for the next General Meeting.

Commercial Statistics.

Decision I.—The permanent committee are to continue the policy outlined in the 1911 decisions; regular monthly publication of imports, exports, visible supply and prices of wheat, rye, oats, barley, corn and cotton. Information concerning visible supply and prices, will, with the authorization of the Governments concerned, be obtained from other sources in the absence of official information.

Decision II.—The commercial movement of cereals and customs statistics are to be investigated and report made to the next Assembly, as outlined by the decisions of 1911. The organization of the customs statistics and the methods followed in the adhering countries will be studied, and careful account taken of the results of congresses held by customs services.

Decision III.—Statistical services are requested to compile at least once a year, at the time of the first numerical estimate, the invisible supply of the cereals (stocks in farmers' hands). This information would be published only on the authorization of the Governments.

Decision IV.—The Assembly insists that the Governments apply themselves to perfecting their services of information on the visible supply of the five cereals mentioned, and organize a monthly service if they do not already possess one.

Decision V.—With regard to prices, the Institute is to continue its studies based on a detailed investigation to be made on the organization of the principal markets of agricultural products, the practices of the trade and the elements that make up the composition of prices. Again, with the authorization of the Governments, recourse will be had to private sources of information if necessary, so as to secure specific information concerning each market.

In this connection a very interesting communication was read by Mr. Lubin, who would like to see published by the Institute, with the prices, indications of the value of the different factors that enter into the formation of the prices, such as: (1) The price paid to the farmer; (2) cost of transportation by land and by sea; (3) the customs duty; (4) brokerage; (5) insurance, etc. This would provide a means of detecting any cause which might be operating adversely on the formation of prices. The public would be given the kind of information which is now usually at the command of large buyers. Mr. Lubin also referred to the usefulness of direct action by the Institute for the purpose of reducing freight charges, in furnishing to the shipping interests the information needed to regulate, to the best interests of all concerned, the course of their operations on the outward and on the return voyages. Since the General Assembly, the permanent committee has adopted Mr. Lubin's proposal, and is to ask the adhering Governments for the requisite information.

THIRD COMMITTEE.

Protection of Birds.

Decisions I. and II.—The Assembly declares its satisfaction because of the measures adopted in the last two years by certain countries, and requests the permanent committee to continue its work of propaganda and report to the next General Assembly. The report of Mr. Ed. de Miklos, of Hungary, on this subject, is replete with interesting facts; as is also the communication made by Mr. A. A. Silantieff, of Russia, on the "Protection of Birds in Russia."

Statistics of Fertilizers.

Decisions I. and II.—The Institute Bureau of Agricultural Intelligence will publish, in one of its Bulletins in the spring and in one in the fall of every year, a review giving and illustrating all the official and non-official information it may be able to collect on the subject of the production, consumption and commerce of agricultural fertilizers, and their effects on the progress of that industry. The same thing will be done annually in the Statistical Year Book of Agriculture. The permanent committee will consider the means to suggest to the Government to enable them to organize, complete and render uniform the statistics of the production, consumption and commerce of fertilizers intended for agriculture.

Dry-farming.

The Assembly, noting the wide extension of the application of the new methods to the cultivation of arid lands, and the results obtained by these methods, as shown by the Report of the Proceedings of the Seventh Dry-farming Congress, held at Lethbridge, Canada, in 1912, instructs the permanent committee to pursue its work of securing information on this question, and to again invite the Governments to send to the Institute the results of their experiments.

Agricultural Bookkeeping.

The Assembly—on the report of Dr. Laur, of Switzerland, where agricultural bookkeeping has been thoroughly organized—requests the Institute to prepare for its next meeting a report with the view of extending institutions for agricultural bookkeeping to as many countries as possible, to the end that the Institute may, in time, utilize the results of these institutions for the purposes of statistical and economic studies.

Agricultural Meteorology.

This question has now entered the sphere of international action, as a result of the proceedings of the meeting at Rome, April 7, 1913, of the International Meteorological Committee. Mr. R. F. Stupart, one of the Canadian delegates to the General Assembly, took an active part in the deliberations of the International Meteorological Committee, of which he was also a member.

Dr. Shaw, president of the International Meteorological Committee, and director of the Meteorological Service of Great Britain, reported to the president of the Institute, that in the first place, he had asked the meteorological services of all the countries to communicate the regulations they have already adopted for the meteorological service in its relations with agriculture.

And, in view of the meeting which had been held the previous week at Rome, the bureau of the committee had asked Mr. Angot, director of the Central Meteorological Bureau of France, and Mr. Palazzo (director of the Italian service) to convoke at Paris a provisional committee for the purpose of formulating a definite proposal.

The provisional committee held a meeting at the end of September last year, at which there attended, besides Mr. Angot and Mr. Palazzo, Mr. Bornstein, Mr. Broounoff, and Mr. Dop. It has proposed to the International Committee to designate a commission for the study of the various questions of agricultural meteorology.

According to custom, such a commission of the committee is practically permanent. It has the power to regulate its proceedings and to choose additional members. On the occasion of the next meeting of the committee the president of the commission will present a report of the proceedings.

At the meeting of April 7, the committee adopted the above-mentioned proposal. It appointed Mr. Angot, president of the permanent commission, and, as members of the commission, Messrs. Bornstein (Germany), Broounoff (Russia), Dop (France), Hergesell (Germany), Palazzo (Italy), Ryder (Denmark), and Stupart (Canada)—with the president at the service of the commission ex-officio.

It was recognized that agricultural meteorology embraces, in addition to questions forecasting the weather, the study of the application of meteorological data, already numerous, to the service of agriculture, which requires a careful organization and work of rather considerable extent. It will be the duty of the commission to do its utmost to promote that organization and to insure the performance of the necessary work.

In view of the exceptional importance of the question of agricultural meteorology, the committee trust that the above-mentioned methods of procedure will lead to good results, and asks the International Agricultural Institute to extend its aid.

Decision I.—In view of this report of Dr. Shaw, conveyed through Mr. Dop (of France) to the General Assembly, the Assembly decides to present to the International Meteorological Committee, through the president of the Institute, the expression of its gratitude to that committee for its favourable treatment of the proposals formulated by the General Assembly of 1911, and especially for the creation of the Permanent International Commission of Agricultural Meteorology.

Decision II.—The report of Mr. Dop (1913), with the approval of the Assembly, will be officially transmitted to the president of the commission to serve as the basis of its labours.

Decision III.—The Assembly is of the opinion that the permanent commission should be composed of meteorologists, agronomists, botanists, phytopathologists, and agrogeologists.

Hence Mr. Dop states in his report that it will be the privilege of each of the States to communicate to the president of the permanent commission the names of the persons whom they desire should form part of that commission.

Decision IV.—The Assembly expresses the wish that the permanent commission may examine the following questions:

1. Statistics of the maximum losses caused by storms.

2. Importance of daily weather reports in drawing up statistics of favourable conditions.

3. Study of the factors that contribute to increased crop yield. Tendency towards maximum yield.

4. Study of the relations between the yield of a crop and the various atmospheric factors.

5. Standardizing of a good agricultural year from the atmospheric standpoint.

6. The drawing up of a scheme of annotation or a percentage scale indicating a good year or an average year.

7. Study of the factors which go to make a good year.

8. Study of the several factors which contribute to the production of a good crop:

(*a*) Time required to insure a good crop;
(*b*) Hours of sunshine required for a good crop;
(*c*) Amount of heat required for a good crop;
(*d*) Rainfall required for a good crop.

9. Preparation of schedules of inquiry to be sent to farmers.

The Diseases of Plants.

Convinced of the importance of an international entente in the campaign against the diseases of plants, the phytopathologists that attended at Paris the Congress of Comparative Pathology, decided, on the initiative of Mr. Dop, to request the French Government to convoke at Rome a meeting of the specialists charged with the study of the question. The meeting could not be held.

Decisions I. and II.—Upon the report of Prof. Cuboni, on behalf of the permanent committee, and of Mr. Foex (of France) on behalf of the competent committee of the General Assembly, that Assembly recognizes that the meeting of an international commission of specialists is indispensable, and expresses the wish that the French Government may follow up the initiative it has already taken by bringing about a meeting of an international commission as soon as possible, and in May, 1914, at the latest.

Decisions III. and IV.—The Assembly is of the opinion that at each of its meetings the specialists of the adhering Governments should meet in a special commission for the purpose of coming to an understanding on common researches and studies; and it solicits the adhering States to study from the present moment the various questions which form the object of the studies of the International Commission of Phytopathologists on the basis of the materials furnished by the Institute.

The International Phytopathological Conference was held at Rome, February 24 to March 4, and was attended on behalf of Canada, by Mr. H. T. Güssow, Dominion Botanist, who was one of the signers of the "Acte Final" for the creation of a permanent International Phytopathological Commission. The object of the conference was to perfect arrangements for the control of plant diseases, and which, subject to certain conditions, would permit the transmission, through the ordinary channels of trade, of nursery stock intended for export.

The Adulteration of Seeds.

The Assembly, on the report of Mr. Jacsewski, of the Imperial Experiment Station, St. Petersburg, concerning the publication of the results of expert tests of seed and grain, and recognizing all the practical importance of rapid and widespread information on the subject, expresses the wish that the permanent committee may examine the question of the insertion in the periodical Bulletin of the Institute information concerning the adulteration of seeds and grain and of the noxious mixtures that may be found in seed grain, which information should be furnished by the Government seed-testing stations. The Assembly considers that the permanent committee should advise the adhering States to require the seed-testing stations to forward such data to the Institute.

FOURTH COMMITTEE.

Economic and Social Institutions.—Statistics of Agricultural Co-operation.

In his report under this head, the delegate of Austria, M. de Pozzi, stated that in accordance with the decisions of the General Assembly in 1911, the president of the Institute invited all the adhering Governments to state what action they were prepared to take toward organizing international statistics of agricultural co-operation. Fourteen Governments have replied. Austria, Spain, France, Italy, and Belgium state that they are now organizing or revising their systems of statistics of co-operation and will take into consideration the requirements of the Institute in this matter. Holland, Switzerland, Denmark, Germany, Japan, and Great Britain state that they are already in a position to supply the Institute with most of the information it requires. Sweden, Mexico, and the United States state that they are not yet in a position to give the information asked for The reporter stated:

"It is gratifying to note that the Governments of several countries of great importance for the development of agricultural co-operation have willingly fallen in with the ideas of the Institute for the organization of an international statistical service for agricultural co-operation."

The following resolutions were unanimously adopted by the Fourth Commission, before which the report came up for consideration, and by the General Assembly:

"1. The General Assembly notes with satisfaction the results so far attained by the inquiry made by the permanent committee on the organization of an international service of statistics of agricultural co-operation on the basis of the decisions of the third General Assembly, in so far as these are not incompatible with the legislation of the several adhering countries.

2. It instructs the permanent committee to continue this inquiry and to begin, as soon as possible, the regular publication of comparative statistical data on agricultural co-operation in the several countries.

"3. It instructs the permanent committee to submit to the next session of the General Assembly a report on the further results obtained by its labour in this field."

Statistics of Crop Insurance against Damage by Hail.

M. Bolle, delegate of Belgium, submitted on behalf of the permanent committee, a detailed report on this subject. In accordance with the decisions of the General Assembly in 1911, the adhering countries had been invited to reply to a questionnaire sent out by the Institute on the statistics of hail. Some Governments merely acknowledged receipt of this questionnaire without supplying the information asked for on the ground that hailstorms are not of importance in their countries, while others returned it duly filled in and forwarded the text of the laws enacted in their countries on hail insurance. These replies clearly show the great importance of insurance against hail and the utility of spreading, through the Institute's publications, a knowledge of the measures taken in the several countries to develop this form of insurance.

The following resolutions were adopted:

1. In view of the valuable services rendered to agriculture by insurance against hail, the General Assembly calls on the adhering Governments whose crops are threatened by this scourge to communicate regularly to the Institute, the legislative, administrative, or private measures taken within their jurisdiction to promote, encourage, develop and control insurance against hail.

2. The General Assembly instructs the permanent committee to spread a knowledge of these measures by means of the monthly Bulletin of the Bureau of Economic and Social Intelligence."

T. K. DOHERTY.

The Honourable the Minister of Agriculture,
Ottawa.